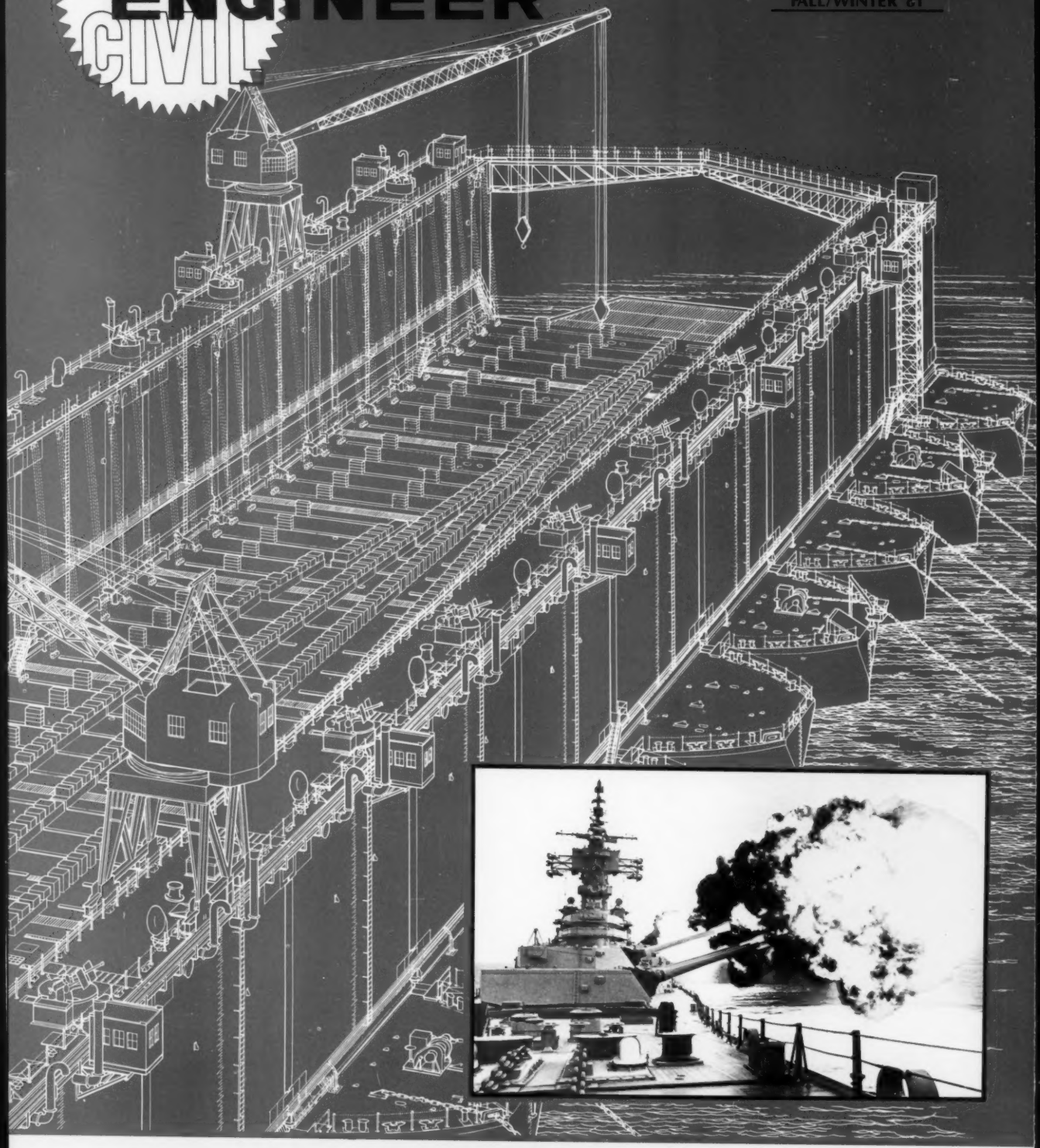
NAVY CIVIL ENGINEER

FALL/WINTER '81



The Days of Giants

He's an engineer directly responsible for $15 million in construction.

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Or, he may assume a position of leadership in a construction battalion of the renowned Seabees, the Navy's own overseas construction force.

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If you're an engineer ready for experience that counts now, you can find out more about the Navy Civil Engineer Corps by filling in and returning the coupon below. To find out more quickly, call collect **202-694-3636.**

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NAVY OFFICERS GET RESPONSIBILITY FAST

Young graduate engineers . . .

you, too, may qualify to join the young Navy civil engineers pictured! For more details call or write the officers listed below who are located most convenient to you. No obligation, of course!

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ON THE COVER

Day of giants . . . the massive instruments of World War II live on with the modernization of the USS *New Jersey* (inset, front cover) and the huge self-propelled crane of the Long Beach Naval Shipyard (back cover). However, the ABSD (front cover drawing), a mobile dry dock capable of handling *New Jersey,* is but an engineering memory.

Basic CEC
Officers Class
No. 160

Graduated
18 Sept. 1981

66 new

Civil Engineer Corps officers have received worldwide assignments following their graduation from the Naval School, Civil Engineer Corps Officers, at Port Hueneme, Calif. Outstanding graduate of the Summer '81 class was Ensign Fernand F. Aucremanne II (indicated by ★). Students graduating with distinction are indicated by (•) and those entering Seabee duty by (†).

ENS Fernand F. Aucremanne
★ BSCE/Notre Dame
to Atlanta, Georgia

†LTJG Frederick A. Aalbue
BSE/USNA
to Gulfport, Miss.

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BSEE/U. of Minn.
to Oakland, Calif.

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•ENS Harlan H. Chappelle
BSChE/Auburn
to Kingsville, Tex.

†LTJG Ronald J. Clark
MSCE/U. of N.C.
to Gulfport, Miss.

•LT Gregory L. Colchin
BSME/U. of Texas
to Dallas, Tex.

ENS Jerry L. Davis
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BSNE/Kansas State
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BME/Villanova
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BSME/USNA
to Pensacola, Fla.

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ENS James A. Jones
BSEE/Miss. State
to Mayport, Fla.

ENS Donald A. Lachance
BSCE/U. of N.H.
to New London, Conn.

CONTINUED INSIDE BACK COVER

NAVY CIVIL ENGINEER
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FALL/WINTER 1981

DAY OF GIANTS — Monstrous naval equipment of WWII years, two of which live on, are featured on pages 3-6 and 13-20.

GEOTHERMAL HEAT is now a fact for the Navy operated facilities at the NATO Base at Keflavik, Iceland. Details found on page 10.

THE THREE R's — rapid runway repairs, become more expedient with new techniques developed by NCEL for the U.S. Marine Corps. See page 26.

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U.S. POSTAL SERVICE

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1. Sales through dealers and carriers, street vendors and counter sales	*0*	*0*
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C. Total Paid Circulation	*400*	*400*
D. Free Distribution by Mail, Carrier or Other Means Samples, Complimentary, and Other Free Copies	*14,900*	*13,500*
E. Total Distribution	*15,300*	*13,900*
F. Copies not Distributed		
1. Copies not Distributed Office Use, Left Over, Unaccounted, Spoiled After Printing	*166*	*100*
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11. I certify that the statements made by me above are correct and complete.
/s/ *HAROLD WELSH*, Editor

Little known facts about some of the Navy's better known

CRANES

• Long Beach, Calif.

The world's largest self-propelled floating crane is owned by the Navy and is in regular use at Long Beach Naval Shipyard.

The YD-171, "Herman the German," was built in 1941 by Demag A. G. at Bremerhaven, Germany. One of four sister cranes, it was used during World War II in the Baltic Sea, at northern German seaports and in Denmark. It was bombed several times and once the entire 200 ton pendulum was demolished. The massive instrument still wears some of the bombing scars.

The YD-171 and a sister crane were captured by the British at Kiel in May 1945; one was seized by the

(Continued next page)

LARGEST

FIRST LAND BASE

HISTORIC

"HERMAN THE GERMAN" or YD-171 was built in 1941 at Bremerhaven and towed after the war to Long Beach, California.

Herman built by Nazis in 1941

(Continued from preceding page)

Russians, the other sunk at Hamburg. One crane was assigned to each of the three allies.

The British attempted to move their fully assembled crane across the English Channel but lost it when the crane capsized during a storm. The Russians moved their partially completed crane overland to Danzig and its location or existence is unknown.

YD-171 was dismantled, with the boom, counter-balance, and other topdeck structures removed and shipped to Long Beach. The supporting pontoon was towed by the Navy across the Atlantic and through the Panama Canal in what became a three month journey. "Herman the German" became a "naturalized American" crane when it arrived for refurbishment at Long Beach in November 1946. Crane reconstruction cost amounted to $350,000. Crane erection was completed in January 1948, and after extensive tests it was placed in operation the last day of that year. The original cost of the crane was about 3½ million dollars. The estimated cost of replacement today is approximately 20 million dollars!

Most floating cranes have no propulsion but rely on tugs for movement from location. The YD-171 however, has three variable pitch propulsion units, each one individually controllable. The crane has a cruising speed of 5 knots and a maximum speed of 6 knots.

Technical data for "Herman" is almost unreal. The support pontoon is 205′ long and 110′ wide, and draws 10′ of water. Total weight is slightly over eleven million pounds. Height of the tip of the boom from the water line is 374 feet. Three 1200 horsepower diesel engines provide power for lifting and propulsion. Slightly over two miles of wire rope is used for the operation of the crane.

The crane was designed to be operated by a crew of three officers and twenty enlisted men, all of whom were berthed aboard. "Herman" is regularly maintained, serviced, inspected, and tested by personnel of the Long Beach Naval Shipyard. □

YD-171, THE WORLD'S LARGEST self-propelled floating crane is owned by the Navy and is in regular use at Long Beach, California.

"HERMAN" has a cruising speed of 5 knots and a maximum of 6 knots.

Land-base crane survives first 'shakedown'

• Port Hueneme, Calif.

The first land base crane adapted by the Navy for shipboard use for container transfer has completed a successful technical evaluation and operational shakedown.

This year, the three ringer crane will further undergo a series of engineering tests at Port Hueneme. Engineers will incorporate technical and operational data obtained and developed during the trials. New cranes and additional components will be procured during the 1983 fiscal year. Then in FY84, the temporary container discharge facility (TCDF) crane system will be tested. Two cranes, aboard a suitable hull, will play an integral role during a full-scale, operational Joint Logistics Over the Shore (JLOTS) exercise at Camp Lejuene, S.C.

The Naval Civil Engineering Laboratory (NCEL), Port Hueneme, has been leading the development of the TCDF system since the program was started four years ago. Early in the schedule, in-harbor tests enabled the laboratory to obtain data needed to develop procurement specifications.

J. J. Traffalis, NCEL test director for the project, said the in-harbor tests demonstrated and measured the effects of a dynamic (motion) environment on the crane. They also determined the capability of motion control devices to reduce excessive and unpredictable pendulation, and ascertained the capability of crane operators to function satisfactorily when exposed to unique sea conditions.

The success of the TCDF crane concept largely depends upon the development of a motion compensation system which reduces the effects of pendulation and vertical motion. The crane can function satisfactorily in calm waters. Operations in rougher, open seas are made possible by adding the motion compensation components of the rider block tagline system (RBTS) which controls pendulation. The goal is to offload containers in waters as rough as sea state 3 (up to five-foot waves).

The Port Hueneme harbor tests followed a series of static land tests during which the crane's structural and mechanical components were evaluated. The 300-ton capacity crane, with a 200-foot boom, is capable of hoisting a 20-foot container (22 tons) at a 150-foot radius. It is designed to operate on a stationary base. But its new work environment, as dictated by the Navy's needs, calls for the equipment to function aboard a floating crane. By lifting containers from one platform to another, NCEL was able to verify predictions of structural behavior and to measure the crane's performance threshold on a moving platform.

It is expected that at least eight more TCDF cranes, at an estimated aggregate cost of $9 million, will be purchased and incorporated into the Navy's Container Offloading and Transfer System (COTS) for use by the fleet. Two cranes will be procured for test during the JLOTS exercise. The remaining six will be bought during FY84-85.

TCDF is the ship offloading subsystem of the integrated COTS system being developed by the Navy in response to the Department of Defense master plan. COTS is designed to discharge container-capable ships where no port facilities exist. The Naval Material Command was ordered to develop the capability with the Naval Facilities Engineering Command assigned the responsibility of Principal Development Activity, assisted by the Naval Sea Systems Command.

Technical evaluation tests last year in San Diego were conducted by Navy personnel under civilian supervision. Two basic technical objectives were achieved before open sea operations began. The crane was installed satisfactorily in San Francisco and towed aboard an LSD to San Diego. There, during 15 days of trials, the system achieved two additional technical objectives; container offloading with motion compensation and outsized load handling.

Ten design factors also were evaluated from data generated during the on-site tests of the crane. They are reliability, logistics considerations, availability, maintainability, compatability, interoperability, training, documentation, human factors and safety, including the RBTS.

Traffalis said the variety of tests has demonstrated successfully the capabilities and potential of the TCDF within the overall COTS plan. □

THE FIRST LAND-BASE crane adapted by the Navy for shipboard use is onboard the DeLong barge.

A FLOATING CRANE hoists the crane aboard an LSD for ship-board testing.

Historic crane hastened WWII repair at 'Pearl'

By JEANNE A. LIGHT
Public Affairs Officer
PacDiv

*Pearl Harbor

The historic, 200-ton capacity hammerhead crane that played a vital role in the days that followed the disastrous attack on Pearl Harbor in 1941 is gone.

The crane was erected in 1935 at Berth 12 in the Pearl Harbor Naval Shipyard by the Wellman Seaver Morgan Company of Cleveland, Ohio. It cost nearly $423,000, and originally was rated at a capacity of 400,000 pounds (200 tons).

The crane was not used after 1972 because of its deteriorated condition, reduced liability and excessive repair and maintenance costs. The Navy had no further productive use for it as lifting requirements could be satisfied by other existing cranes.

In late 1979, the Pacific Division of the Naval Facilities Engineering Command (PacDiv) awarded a contract to the Honolulu office Weitzul Construction, Inc., for removal of the deteriorating structure.

According to CDR Henry J. Rinnert, production engineering officer at the Pearl Harbor Naval Shipyard at the time the decision to remove the hammerhead crane was not an easy one to make, nor did it come overnight. The Navy spent years on studies in an effort to find a feasible solution that would benefit not only the Navy but also the greater public interest.

"The Navy fully understands and agrees with the principle of historic preservation," said CDR Rinnert, "but sometimes, as in this case, preservation must give way to progress. A 1978 Navy study showed the crane is hampering the Shipyard's present operations and is costing the taxpayers too much money."

The mammoth structure's lifting capabilities proved essential to the Shipyard repair effort following the Dec. 7 Pearl Harbor attack. The crane ws used to lift and replace guns on the USS California, and assisted in the repair of other heavily damaged battleships.

During peacetime operations, the crane was used to unload heavy generators for the Hawaiian Electric Company from commercial ships because Honolulu Harbor at the time did not have the lifting capabilities to do the job.

Donald C. Jackson, a civil engineer with the National Park Service, an office in Washington, D.C. concerned with the preservation of historical structures, spoke of the hammerhead crane in a 1977 interview:

"I shudder to think what would have happened to Pearl (Harbor) if the hammerhead crane had been bombed," he said. "I think the repair capabilities would have been seriously undermined during the war and I think that was one of the crucial reasons we were able to bounce back after the attack. The Shipyard repair facilities were not impaired and (repairs) began at once."

Because of the historical significance of the crane, the procedures which eventually approved its future demolition were long and complicated.

PacDiv's CDR Mario Barrata, former shipyard production engineering officer, was assigned to oversee the studies which eventually determined the fate of the crane.

The 1978 study showed it would cost nearly $750,000 to repair and preserve the structure, and nearly $1.1 million to restore it. In addition to the initial costs for either repair or preservation, annual maintenance figures were estimated at approximately $300,000. With inflation now in the double digits, those estimates would be considerably higher today.

The Navy cleared military channels and, in November 1976, received permission from the Naval Sea Systems Command in Washington, D.C. to demolish the crane.

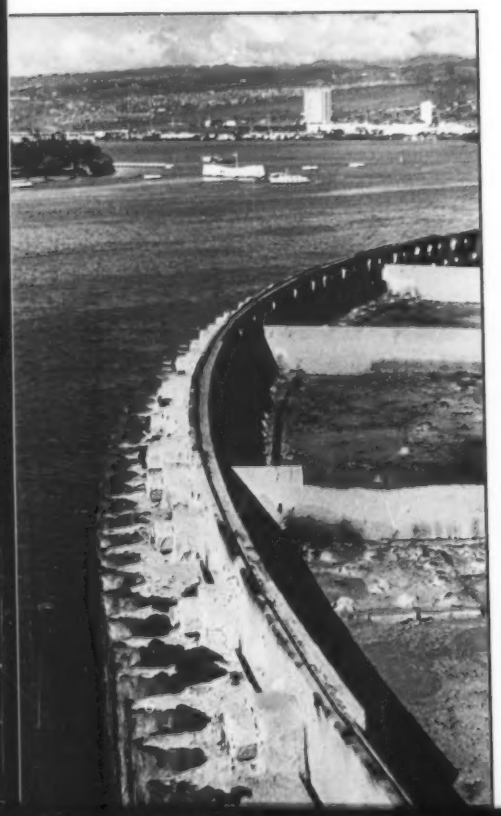
"Because the Pearl Harbor Naval Base is a national historic landmark, the demolition also had to be cleared through the State of Hawaii Historic Preservation Officer and the Advisory Council on Historic Preservation in Washington, D.C.," said Glenn Miyasaki, an environmentalist at the Shipyard.

Miyasaki said the Navy also was required to file an environmental impact assessment to determine if removal of the crane would have an adverse effect on property included in the National Register of Historic Places.

In May 1978, then Commander of the Naval Base, RADM R. S. Wentworth, Jr., stated the Naval Base position in a letter to the National Advisory Council for Historic Preservation: ". . . It is the decision of this command tht preservation of structures, while desirable, may at times not be possible, and then pictorial documentation must suffice for future generations."

In December 1978, the National Advisory Council on Historic Preservation granted the Navy permission to remove the crane, stating that ". . . preservation had to yield in order to fulfill the greater public interest."

Approximately a year and a half later the historic crane was gone. It had served its country well. On April 17, 1980, a final inspection was made of its former site. □



THE VIEW FROM THE TOP of the 166-foot tall crane is a spectacular panorama of the Pearl Harbor area

Maintenance assistance — just a phone call does it!

By JAMES F. JENKINS
P.E., Calif.
Head, Facilities Engineering Support Office

• Port Hueneme, Calif.

When confronted with difficult maintenance problems, public works officers and their staffs have easy access to professional assistance through use of their Autovon telephone lines. The Facilities Engineering Support Office (FESO, Autovon 360-4070) has "hot line" service at the Naval Civil Engineering Laboratory, Port Hueneme, Calif., to assist Navy personnel around the world.

Funded by the Naval Facilities Engineering Command (NAVFAC), FESO was established officially in 1976 as an independent laboratory program. Its purpose is to provide consultant service and support to naval properties. FESO assures effective responses to problems and questions, without charge. NCEL calls upon a professional staff of more than 180 engineers and scientists. If they cannot answer a question or solve a problem, they will recommend other referrals.

FESO is geared for rapid action. Nearly 40% of requests are answered the same day received; 66% are answered within a week; and, the program's success can be seen in increased utilization. In 1978, the laboratory responded to approximately 600 requests for assistance from about 160 different activities; last year, FESO received more than 800 inquiries from about 190 activities.

The office plays an important role in sophisticated technology and changing construction and maintenance techniques. Most field activities don't have the facilities or personnel to conduct necessary short-term testing or to analyze problems of a technical nature.

(Continued next page)

A SAMPLE OF POLYURETHANE foam roofing is examined by Dr. Robert Alumbaugh, laboratory chemist, before he recommends proper repair procedures. Jim Jenkins, head of NCEL's Facilities Engineering Support Office, observes as Alumbaugh removes sample from oven after drying of insulation to determine moisture content.

FESO phone service

(Continued from preceding page)

As NAVFAC's only research and development activity, NCEL is in a singular position to offer additional services. Accordingly, FESO serves as the catalyst in solving field problems. One can imagine the problems arising from such areas as shore and harbor facilities, environmental protection, materials technology, ocean engineering, energy systems and technology, and advanced base and amphibious facilities.

While a majority of inquiries from the field deals with materials and corrosion problems, some requests pose peculiar demands and require individual attention by an appropriate specialist.

Some examples of FESO's services are:

• The Marine Corps Air Station, Beaufort, S.C., had a problem with newly applied reflective airfield markings (paint and beads). They failed to provide sufficient reflection for night landings. A sample of the markings was analyzed by an NCEL chemist. He determined that while enough beads may have been applied, many failed to stick to the paint. The paint was too thin (less than 50% of thickness required) and had coated most of the bead surface. The problems were attributed to excessive thinning of the paint prior to application. It was recommended that the contractor reapply the markings with adherance to specifications.

• The Public Works Center, San Diego, was frustrated by recent air pollution regulations which banned previously acceptable paints. Approved latex paints had been peeling when applied over existing enamel paint. After analysis, the NCEL materials science division determined that alkyd coatings could be used as a primer over enamel, allowing the latex to stick. Although alkyds are banned as a topcoat by pollution regulations, they are acceptable as primers.

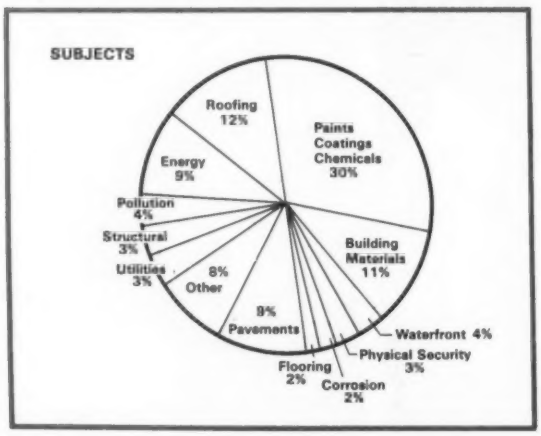
• The Public Works Center, Pensacola, Fla., posed this question to FESO: "Can polyurethane foam roofing be used in subtropical climates to repair built-up roofs?" NCEL said the success of polyurethane foam roofing depends upon the condition of the roof and the proper foam application. Laboratory roofing specialists will conduct an on-site inspection of the existing roof to determine if foam repair is practical. If so, they will assist in writing the specifications for repair and then inspect the job during application. If the existing roof cannot be repaired using foam, an alternative roof will be selected during the on-site inspection.

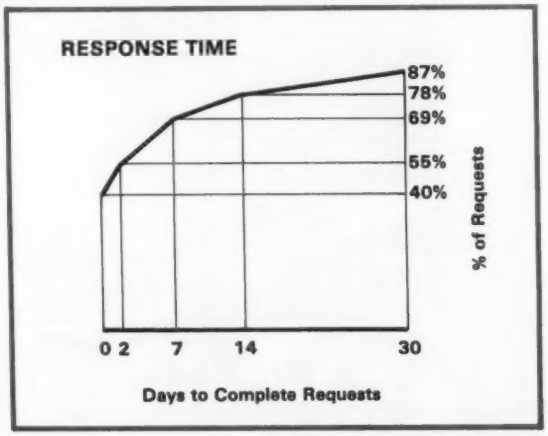
• The U.S. Naval Communications Station, United Kingdom, faced a problem when asbestos was suspected in building materials. After analyzing samples, NCEL found that one did not contain asbestos but another sample contained 30-40% asbestos. The laboratory warned of potential problems for workers cutting and drilling into materials containing asbestos and for occupants if the material deteriorated. The lab forwarded specific procedures for a survey to determine if an occupant problem existed. Guidelines for worker safety also were forwarded.

• The Naval Air Facility, Misawa, Japan, wanted to know the best method to repair spalled areas in portland cement concrete pavements. A recommendation was available in unpublished NCEL research. The method was included in a condensation of current NAVFAC guidance and the state of the art on spall repairs. The laboratory recommended the application of epoxy grout. If the modified procedure is applied on a trial basis at the station, NCEL will ask for feedback of results. This information will be relayed to other inquirers and could be incorporated in an update of NAVFAC procedures.

• The Naval Air Station, Fallon, Nev., wanted to dispose of waste oils from aircraft in the most practical way. Was it more economical to sell the oil? Could it be used instead as a supplemental fuel in a high temperature water heater? An NCEL engineer did a cost study based on the selling price of waste oils and the cost of fuel oil at the site. He also evaluated potential problems with burning waste oils or waste oils/fuels blends in the type of burner involved. He recommended that the waste oils can be burned safely with only minor adjustments to the burner. Cost savings could be significant.

By sharing field problems and questions with NCEL, field personnel frequently can obtain immediate solutions. Engineers and scientists, keeping abreast of the real problems at shore activities, also are better able to direct their long-term research and development efforts toward products of benefit to the NAVFAC mission. □





Harsh weather projects made easier with air-bubble shelter

By LT C. L. DOHERTY, CEC, USNR
R. A., Tex.

• Dallas, Tex.

A supply depot is suddenly required at a remote site with a harsh winter climate to be operational within 35 days. You become aware of this priority when the battalion detail is ordered to deploy to the site and construct two insulated metal storage buildings. Prepositioned materials and equipment are available to transport with your detail. You have 96 hours to plan, pack and depart for the site.

Your construction planning is composed of the customary reviews of manpower, equipment, materials and placement methods. A major consideration is the harsh weather, characterized by snow and blowing rains. This is expected to reduce labor efficiency and perhaps cause work stoppage.

Supply containers are stocked with extra cold weather clothing, heaters, canvas windbreaks, snow removal tools and many other necessary commodities peculiar to the mission. To increase the probability of success leads to the consideration of a temporary air supported structure as a shelter.

The plan is to moderate the immediate working and resting environment with the protection of a translucent air-tight bubble. An estimated one additional crew day of work is to be expended in erecting the shelter. The selected 70′w × 35′h × 150′l shelter consists of a vinyl coated single membrane fabric and is warm air supported.

Screw-in anchors secure the structure to the earth to withstand 100 m.p.h. winds and help provide a perimeter air seal. Vehicle and pedestrian air locks, an air blower inflation system, and special heater vents are packed as standard equipment. The deflated package of 500 c.f. is shipped with other containers for the project. Chances of success on the upcoming mission are now protected.

□ □ □

Pneumatic, or air structures have existed since the 1940s. They were originally developed for military use as protective enclosures for radar tracking equipment. Subsequent military uses have been for aircraft and heavy ground equipment repair shelters, combat area hospital wards, and storage spaces.

Most defense research and development has been catalogued by the U.S. Army at its Natick laboratories.

Little has been conducted specifically for construction support.

Not to be confused with tension structures made with fabric materials, there are three basic types of pneumatic structures. The air-supported single membrane is the simplest and least expensive. Support depends on a slightly pressurized (1.03) inner space. It must be inflated by a continuous air blowing operation. Air locks and a perimeter ground level air seal are normally built-in features. Snow and wind load resistance are often very good. Height dimensions by design inflate best to about one-half the width. Overall dimensions theoretically are unlimited!

Most structures manufactured to date have a estimated lifespan of three to ten years. The more durable air-inflated double membrane is self supporting and doesn't require continuous air blowing, air locks, or a foundation seal. Support depends on adjoining air beams which are typically vault shaped.

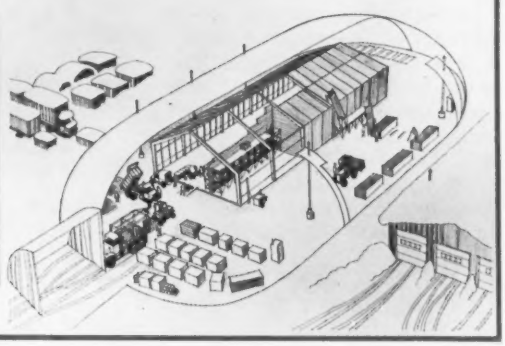
The less common dual type is a combination of one of the above and conventional rigid wall construction. These are most often erected over large public spaces and are permanent. Costs for long span roofing systems of this sort have ranged from about 30-50% relative to that of conventional construction.

Commercial experimentation with air structures before 1970 was mainly a curiosity. The expanded development in the past decade has lead to its uses with public recreational areas, pools, mall courtyards, schools and as storage areas and greenhouses. These structures have been erected for both temporary and permanent purposes.

Industrially, single membrane air structures have been used on limited occasions. Some construction contractors have successfully put to use these types of temporary shelters in both Canada and the northern United States. Some reports have indicated increased rates of sitework, concrete placement and vertical construction during seasons of inclement weather. Costs for these temporary installations have been justified by increased labor efficiency and fewer delays.

The Naval Civil Engineering Laboratory has previously recommended that Seabees test and evaluate these types of structures for future use. As this potential now exists, various construction sites no longer need be hampered by rain, snow and wind chill factors.

Perhaps on the next Seabee construction project a commander may find these extra preparatory measures worthy and necessary. □



An air supported structure may be used to protect a Seabee construction site.

THE GEOTHERMAL PLANT in operation at Svartsengi does little to contaminate Iceland's clean air.

Savings go up while pollution goes down at Navy's only geothermal heating facility

• Keflavik, Iceland

The Navy's only geothermal heating facility began operations September 23, 1981, at the U.S.-manned NATO Base at Keflavik, Iceland. Vice Admiral Thomas J. Kilcline, Commander, Naval Air Forces Atlantic Fleet, opened a ceremonial valve, signifying the flow of geothermal energy onto the NATO Base.

According to Lt. Doug Huggins, the NATO Base geothermal officer, the purpose of using geothermal heat is for the conservation of oil. He added, "Technology and the price of oil made geothermal heat economical." The use of this heating system is projected to be one third the price of the oil normally used in the Navy owned systems.

The Navy began negotiations with Iceland to share geothermal heating in 1974. Actual conversion of Navy owned heating systems in Iceland started at the Navy transmitter site in nearby Grindavik in November 1976.

The Sudernes Regional Heating Company is completing the geothermal plant, supply system and the distribution system on the NATO Base. (See *The Navy Civil Engineer,* Summer 1981, p.7.) Sudernes Heating

HOLDING TANKS and pumping station near the NATO base will play a key role in providing geothermal energy.

THE NAVAL STATION Air Operations building is one of the many buildings on the NATO base being prepared for the use of geothermal energy.

will supply the geothermally heated water to every building on the base. Under a Navy utilities contract, Sudernes Heating will provide heat for ten years at a cost of approximately $52 million. The Navy will also pay Sudernes Heating $18.8 million for the distribution system and plant capacity. There is also a Navy contract for construction to modify the heating system in the NATO Base buildings with Icelandic Prime Contractors for $15 million, and an additional $14 million is programmed for 1983. The geothermal project is expected to pay for itself over the life of the contract. By converting to geothermal heat the NATO Base should conserve approximately 166,000 barrels of fuel oil per year or approximately one tanker of oil per year.

Geothermal energy is stored heat energy generated in the earth's interior and is accessible from heated rocks or water within the upper 10 kilometers of the earth's crust. The heat escapes slowly from the earth's core to the crust through solid rocks, by circulating fluids and by molten rock (magma) or lava.

Thermal gradient (the rate at which temperature increases with depth below the earth's surface, expressed as degrees per unit of depth) is about 25 degrees centigrade per kilometer. There are many areas whose geologic conditions have created local thermal gradients much higher than the average. These areas are usually associated with new volcanic activities, thin crust, or tectonic plate boundaries. The thermal reservoirs contain enough concentrated heat to make up a potential energy source.

In Iceland, sea water transfers this heat from deep sources to a geothermal reservoir at depths shallow enough to be trapped by drill holes. Hot springs and geysers are also common.

Formal use of geothermal energy in Iceland began in the 1920s when a well near Reykjavik began producing water at 87 degrees centigrade. The water was piped for a distance and used to heat a swimming pool, a hospital, two schools and 70 homes. Ninety-eight percent of the houses in Reykjavik and its suburbs now obtain heat and hot water from geothermal sources. The cost is less than one fourth of what it would be with oil furnaces.

The geothermal water in the Sudernes area is under pressure and is considerably above the boiling point at 455 degrees Fahrenheit. The water is brought up out of a well and is allowed to "flash" or boil off into steam rapidly. The water left behind contains all of the salt and silicates and the steam is clean, except for gases.

The water is "flashed" a second time to produce clean steam and the leftover water, containing salt and silicates, is sent to a holding pond.

The purified steam is used to heat cold water from various wells. The salt and silicate laden water will be used eventually for industry.

According to Lt. Huggins, the geothermal system is economical in many ways. He said the system does not place heavy demands on natural resources. "There will be virtually no pollution," he added. He also said maintenance for the system would require only a basic familiarization and repairs would be incorporated into the NATO Base Public Works Department. □

APPROXIMATELY NINE MILES of pipeline connect Svartsengi, the geothermal plant site near Grindavik, and the Naval base.

Advice of Counsel

". . . as a litigant, I should dread a law suit beyond almost anything else short of sickness and death" Judge Learned Hand

•Alexandria, Va.

If you *(government employee)* can be sued *(you can)* and may be liable personally *(you may)*, you must necessarily go through the litigation process as economically with time and money and as gracefully and good humoredly as a hazardous experience permits.

Suits begin by service of a summons. Make note at once of where, when, and from whom you received it and preserve the envelope; for an incorrect service may render the whole suit void for plaintiffs. The summons calls upon you (a defendant) to answer the complaint within a short period, in federal courts 20 days for private parties and 60 days for government parties. Extension of time to answer (at least once) can usually be obtained, with or even without consent of plaintiffs, by application to the court.

Accompanying the summons will be a complaint, a long document usually consisting of — several numbered paragraphs describe the parties, plaintiffs and defendants and allege jurisdiction. Many paragraphs recite the events alleged to result in liability. Several counts, each in a few paragraphs, state the basis upon which liability is alleged.

Finally, several paragraphs demand relief in money damages, an injunction to do or not do something, a declaration of rights, and often "such other relief as the court may order." Documents, for example a contract or affidavit, may accompany the complaint.

The mandate of the properly served summons is that each defendant answer the complaint, paragraph by paragraph and sentence by sentence admitting, denying, or alleging lack of knowledge, and perhaps alleging exculpatory circumstances.

But before even time to answer plaintiffs may seek preliminary relief to avoid irrevocable damage or change of position by a temporary restraining order (TRO) which could be issued without even notice to defendants; or preliminary injunction, which is issued only after some short-noticed and brief argument or testimony.

The TRO can only last 10 days but may be renewed. Defendants may seek a bond to pay their damages if relief is ultimately denied. Preliminary relief is extraordinary; and judges look to the harm to plaintiffs if not granted, harm to defendants if granted, the likelihood of success on the merits, and the public interest.

Before answering, defendants may move to dismiss on grounds that court lacks jurisdiction, the summons was improper, the complaint (even admitting its factual allegations) states no grounds upon which relief can be granted, or some special defense (statute of limitations, sovereign immunity, etc.) bars relief. Defendants or plaintiffs may move for summary judgment on all of these grounds or others, with the difference that new facts are alleged and stated to be not in dispute. A motion for summary judgment may be quite lengthy and is supported by documents and statements under oath (affidavits).

Plaintiffs (or defendants) may seek discovery from other parties. Discovery may consist of interrogatories(written questions), which must be answered one-by-one usually under oath. It may be a series of requests for admissions, each of which must be admitted or denied with particularity and reasons.

It may be a demand for production of documents or other evidence (e.g., samples). It may call upon a person to appear for a deposition, answering questions as at a trial with cross examination, or the deposition may be written interrogatories (questions written in advance and posed by the authority taking the deposition). It may demand inspection of things, sites or persons.

By now you, as a government employee, fully realize the need for legal help, to endure and survive this process. If you are named defendant in an official capacity, that legal help will be provided by Navy lawyers and by the Department of Justice for court appearances. However, if the complaint names you defendant in words like "personally and individually," you must ask that the government lawyers represent you, by a written request that recites your connection with the events, states that all your acts were in an official capacity and in good faith, and concludes with an affirmation under penalties of perjury.

In some circumstances, as where federal crimes are charged, or where the government has a conflicting position, the Navy or Department of Justice may be unable to or decline to represent you; but then they may in a few circumstances pay for private counsel.

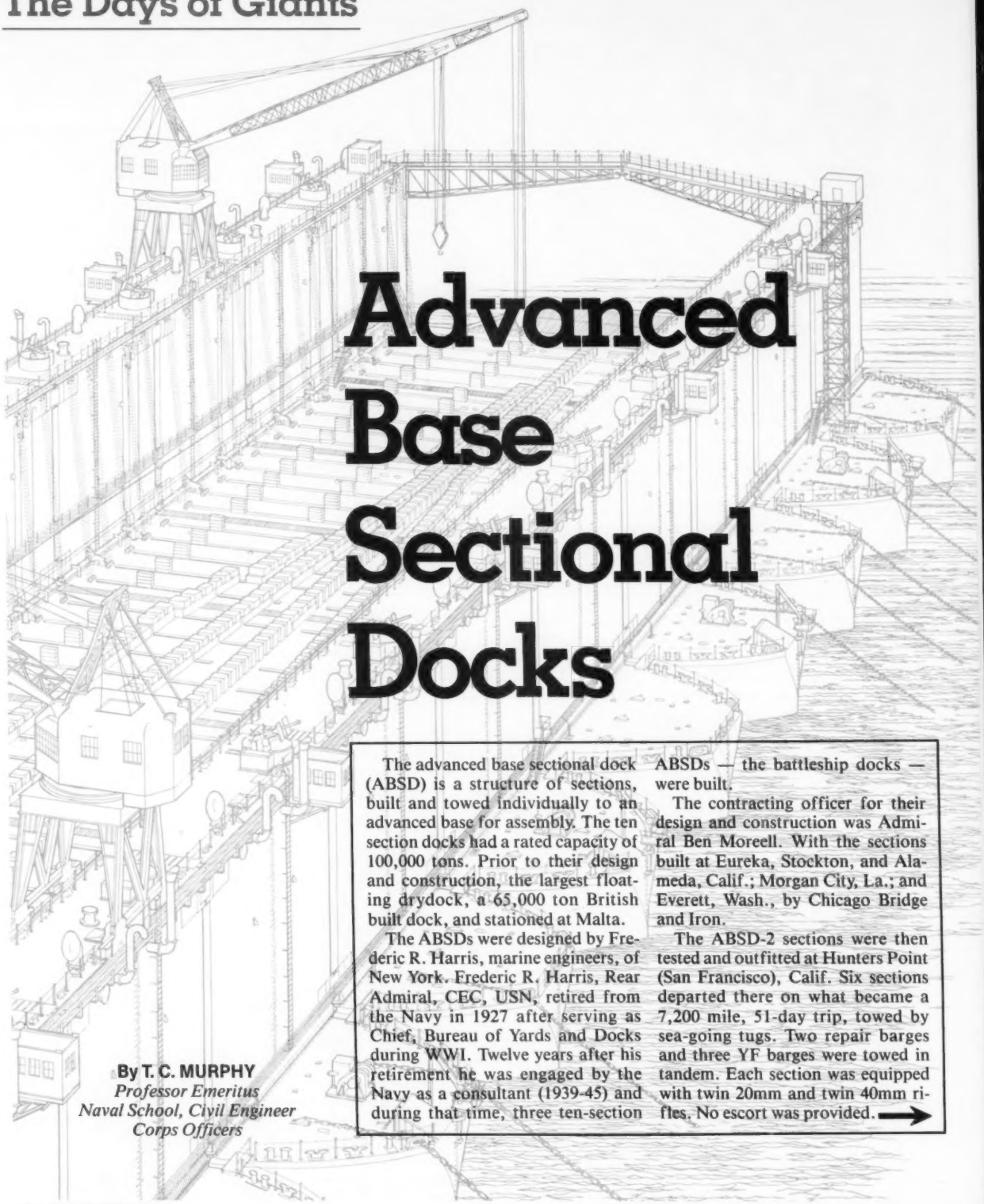
Legal counsel must thoroughly investigate the law and facts to determine strategy and tactics for defense. These will be reflected in the motions filed on your behalf, in the answer, and in requests on your behalf for discovery from the plaintiffs. These efforts will be directed to gathering evidene for the trial: from witnesses qualified and with memories refreshed for direct and cross-examination; documents supported by witnesses or otherwise authenticated; real evidence in samples or objects; tests or investigations; and exhibits (diagrams, blown up photographs). These must survive objections as irrelevant (not proving anything pertinent), immaterial (inconsequential or misleading) and incompetent (not authenticated, hearsay, better evidence available).

The judge may order a pretrial conference or issue a pretrial order to get documents agreed upon, witnesses named, admitted facts stipulated, legal issues briefed, and other matters settled to reduce trial time.

The trial itself is anti-climatic, the part of the iceberg of a legal proceeding that shows up visible to all and well known from stage or screen. If you win, that ends the suit with a judgment or order of dismissal. And if you lose, you face an order or judgment that must be satisfied unless you decide to seek review by appeal.

Such review is accomplished by a prompt notice of appeal, following by making and sending up the record (those parts of the transcript, evidentiary documents, etc., pertinent to issues being reviewed), preparing briefs, making oral argument, and waiting for the decision in an opinion, which results in the order on remand affirming, reversing or making other dispositions.

Your suit, for better or better for worse, is finished. □



Advanced Base Sectional Docks

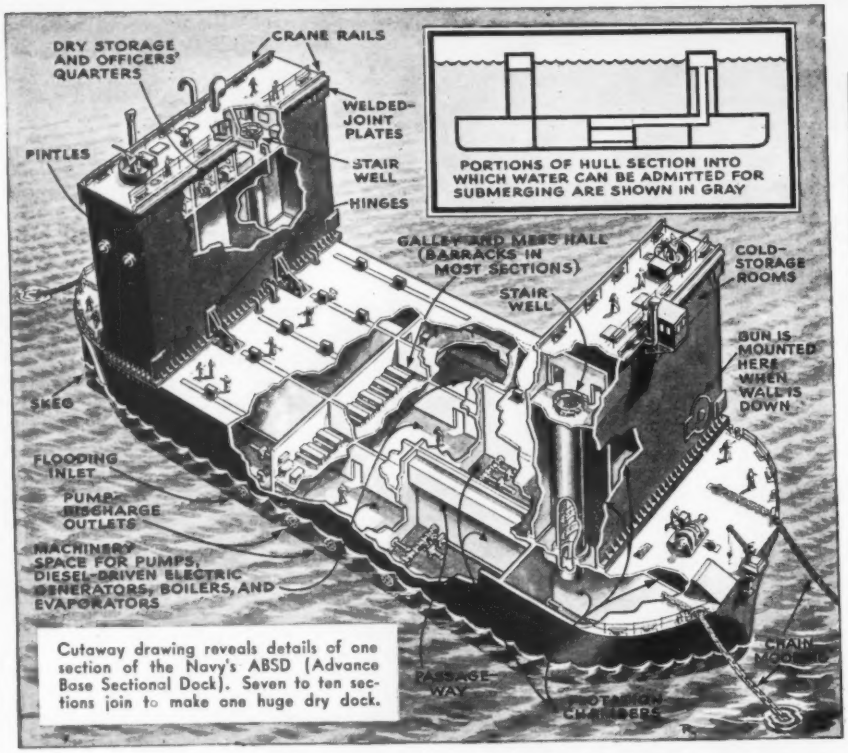
By T. C. MURPHY
Professor Emeritus
Naval School, Civil Engineer
Corps Officers

The advanced base sectional dock (ABSD) is a structure of sections, built and towed individually to an advanced base for assembly. The ten section docks had a rated capacity of 100,000 tons. Prior to their design and construction, the largest floating drydock, a 65,000 ton British built dock, and stationed at Malta.

The ABSDs were designed by Frederic R. Harris, marine engineers, of New York. Frederic R. Harris, Rear Admiral, CEC, USN, retired from the Navy in 1927 after serving as Chief, Bureau of Yards and Docks during WWI. Twelve years after his retirement he was engaged by the Navy as a consultant (1939-45) and during that time, three ten-section ABSDs — the battleship docks — were built.

The contracting officer for their design and construction was Admiral Ben Moreell. With the sections built at Eureka, Stockton, and Alameda, Calif.; Morgan City, La.; and Everett, Wash., by Chicago Bridge and Iron.

The ABSD-2 sections were then tested and outfitted at Hunters Point (San Francisco), Calif. Six sections departed there on what became a 7,200 mile, 51-day trip, towed by sea-going tugs. Two repair barges and three YF barges were towed in tandem. Each section was equipped with twin 20mm and twin 40mm rifles. No escort was provided. ➡



Cutaway drawing reveals details of one section of the Navy's ABSD (Advance Base Sectional Dock). Seven to ten sections join to make one huge dry dock.

We did not learn of our destination until we had been at sea a week: it was to be Seadler Harbor, Manus, Admiralty Islands — a place most of us had never heard of. We became avid map-readers, trying to guess the course we would take. We were very conscious of the fact that we were in a very large ocean, unescorted, and were moving along at a little under six knots. It didn't help one day to see three aircraft overfly us at a high altitude, circle and then to drop to fly directly over us again. We felt immeasurably relieved when one of them made a signal: *"What is it?"*

Our course took us to Christmas Island from where we 'steamed' almost due west until we turned to a course of 345° and headed for the pass between New Guinea and New Georgia. We hugged the New Guinea side; New Georgia was still in the enemy's hands; 100,000 pairs of hands. We would be rudely reminded of this nine months later.

First word of D-Day in Europe reached us on 9 June; we all kept our fingers crossed and said many prayers for the invasion force — and waited anxiously for some word of what we hoped would be its progress. It was some time before we knew it had succeeded.

Also in June, we had the exciting news of *FORAGER* — the campaign for the taking of the Marianas. This operation involved 535 Navy ships, put 127,000 men ashore, destroyed 346 enemy planes, in what is now known as the Marianas Turkey Shoot, and sank three of the enemy's largest carriers. In the greatest carrier battle in history, Japanese air power was reduced to impotence.

When the Japanese Fleet anchored off Okinawa 22 June, it had just 35 serviceable aircraft of its original 430. It had also lost 31 of its 43 BB float planes.

Prime Minister Tojo and his cabinet resigned on 18 July, the day the loss of Saipan was announced in Japan.

Seadler Harbor, Manus, is 14 miles long, four miles wide, and deep; an excellent fleet anchorage. It soon became one of our largest advanced bases and was a staging point for the invasion of the Philippines and the decisive naval battles of the Philippine Sea, which was just four months into the future. We arrived 22 June and assembly of the dock began. For the next year work was scheduled on a 24-hour day, 7-day week routine.

Each drydock section consisted of a pontoon (faired fore and aft to give it a rudimentary ship shape) 256 feet in length, with a beam of 80′. Folded to the deck on four hinges (6″ pin) were the two wingwalls — boxes — 20′ × 80′ × 55′ — which when raised and bolted to the pontoon and joined with nine other sections would form the sidewalls of the drydock.

When assembled, the completed drydock was a structure 827 feet in length, with a drydock basin 140′ wide. With the addition of a timber outrigger at each end, the overall working length was 927′. The largest ship docked by the ABSD-2 was the battleship *Iowa,* which was 887 feet long, with a beam of 108 feet, and weighing 54,000 tons.

Each pontoon consisted of twelve ballast tanks, six each side of the engine room; engine and machinery spaces, quarters and mess for 65 men. Each wingwall contained three ballast chambers up to the safety deck, about 12′ below the top of the wingwall, upon which the cranes (45 ton capacity) operated. Heavy rails allowed the cranes to move the full length of the dock. The spaces on the safety deck were used for ship's service, laundry, offices, wardroom and officer's quarters.

The wingwalls were raised into an upright position by using two telescoped columns each atop a 500-ton hydraulic journal jack on hinged shoes welded to the pontoon deck, and engaged to the inboard edge of the wingwall by another hinged connection. Manually placed four inch pins through holes in the columns at intervals matching the throw of the journal jacks, alternately, raised the wingwall approximately a foot at a time. When the wall approached the point of balance, four tension bars were harnessed to the column assemblies so that the wingwall could be settled gently upon the coaming which formed its base.

The completed dock had no rigid connections between pontoons, but the wingwalls, which when joined together constituted two box girders 20′ wide by 55′ deep and 827 feet long, which were joined by welded splice plates. These parallel box girders produced the structural integrity of the dock. The connection between them and the ten pontoons consisted of 4000 two inch high strength bolts. The hull was of 7/16″ steel.

The connections between wingwalls consisted of one and a quarter splice plates engaging two inch keeper plates built into the wingwalls. The keeper plates extended across the wingwall deck, six feet down the inboard and outboard vertical faces of the section; similarly at the bottom of the wingwall.

The splice plates were first bolted to kill any motion between sections and then fillet-welded to the keeper plates. Large turnbuckles between adjoining pontoons added to the stability needed for welding.

The wingwall connections were designed to give the dock a total moment strength of 500,000 foot tons, according to CDR Werner Ammann, writing in *The Military Engineer* (Feb. 1946). The total inter-section shear strength was 8000 tons. This design moment strength was chosen at about 25% of the moment strength of the largest battleship to be docked.

CDR Ammann wrote that it was considered necessary to design the docks for the moment strength practically equal to that of the largest ships because of the prospect of their battle-damaged condition where they had essentially lost their moment strength. This would have produced an unwieldy and very costly wingwall and connection design. In view of this, the cost in time, and the feasibility of controlling dock deflection by careful monitoring, pumping and flooding to accommodate the load distribution, the lesser moment strength design was accepted.

He continued, that under proper operations control of the overall deflection could be kept within three inches in the length of the dock. This is well within the general requirement (at that time) of not deflecting a ship more than one inch per 100′ of length. A three inch deflection in the length of the dock produces an extreme fiber stress in the wingwall splices of about 3500 psi; in other words, an overall deflection of 18″ would not produce stresses beyond the working allowable.

The completed drydock was anchored at a site near Papitalai Point by 32 15-ton anchors and 3-inch cast steel chain, its longitudinal axis in the direction of the prevailing wind.

Eighty-seven days after arrival at Manus, the ABSD-2 docked its first ship, the *USS Whitney,* a tender.

Someone thought a celebration was in order; he just happened to have 'found' a box compass — which was something the other three chiefs in our quarters had never seen — and proceeded to drain it.

This was done by removing a screw-plug on the hemispheric bottom. While this is happening he — obviously having some earlier experience with this operation — informed us that the box compass contained a gallon of 180 proof grain alcohol and that draining it was a court-martial offense; however when cut with water, sweetened with fruit juice, it made one marvelous drink! So the four of us proceeded to christen the ship.

That night, we slept the sleep of the embalmed.

A month later, ships hit by enemy fire during the battles of the Philippine Sea began arriving to our ABSD-2 for repair.

For instance, the cruiser *Houston* had taken two torpedoes; the first off Formosa on 14 Oct 1944; the second while she was under tow heading for the ABSD-2 at Manus. That she reached Manus at all was a miracle of damage control and seamanship. The hull destruction sustained by that ship had to be seen to be believed. She probably could never have made it to Pearl, or Bremerton, or Hunters Point. We put a king sized patch on her! (Ed. Note: This was the third USS *Houston* — not to be confused with the second *Houston* which was sunk in February 1942.)

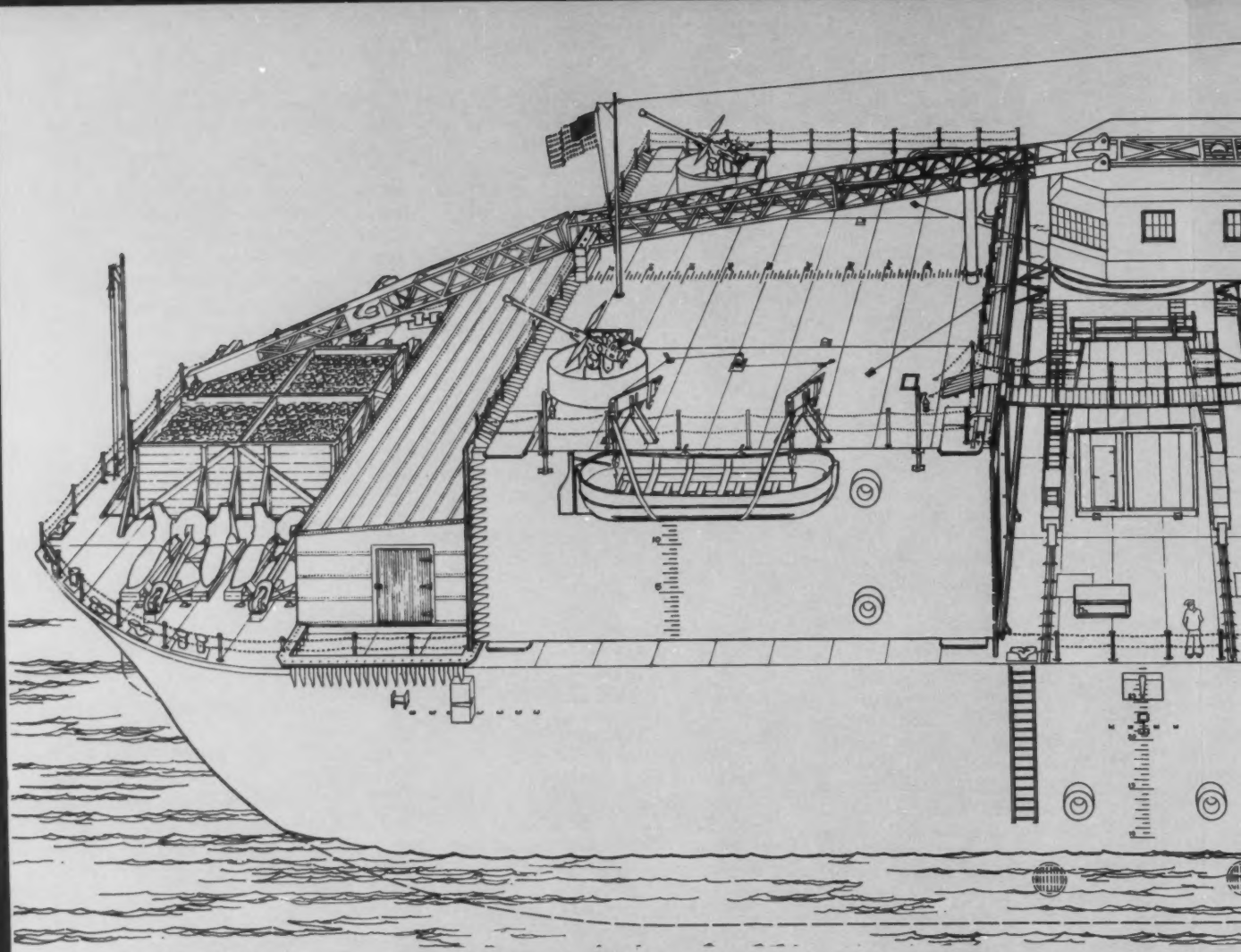
Each of the ten sections operated its own diesel power plant for lighting, ventilation, and operating two giant (26″) pumps that evacuated the ballast tanks and large flooding valves. We also furnished power to the docked ships.

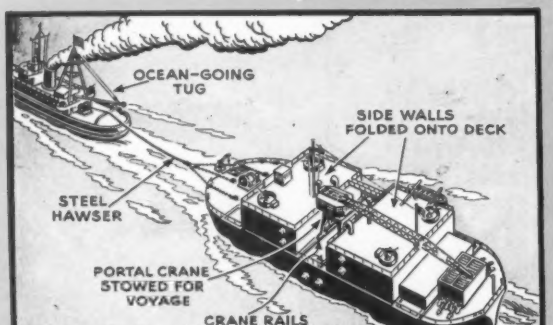
The engine room operated about 80 feet below the surface during submergence and the crew's mess was just a deck above. They often talked of submarine pay. Those whose docking stations were on the surface often skipped lunch on docking days.

Escape during an emergency from both spaces was possible via a passageway off the mess to the wingwall where a circular stairwell led to the wingwall deck. A watch was stationed at each basin deck hatch and stairwell during submergence for observation of leaks, untightened hatches, etc.

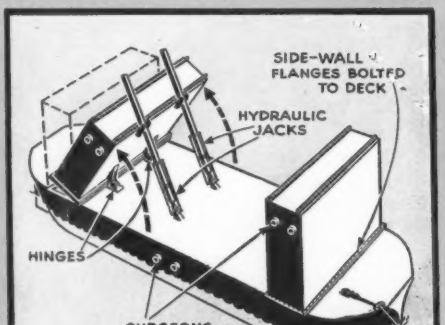
(Text continued page 18)

USS New Jersey, contemporary *Iowa*-class battleship, recently entered the Long Beach Naval Shipyard for modernization and rearmament prior to scheduled recommissioning in 1983. The ship, 877½ feet long with a 108′ beam, displaces 58,000 tons under full load. The monstrous vessels of this class were regularly served by the ABSDs throughout the WWII Pacific Theatre.





ASSEMBLY. Sections of an ABSD are towed separately by tug or Liberty ship, moving close to a combat zone. Two sections carry the dock's electric cranes.



Anchored at its base of operation, a section raises its side walls by hydraulic jacking gear. Walls are then bolted down to the bed plates.

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A section of an ABSD, with wi
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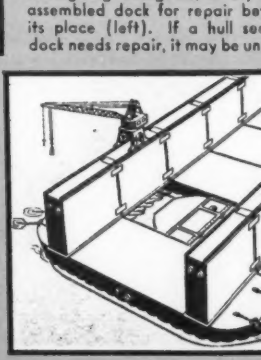
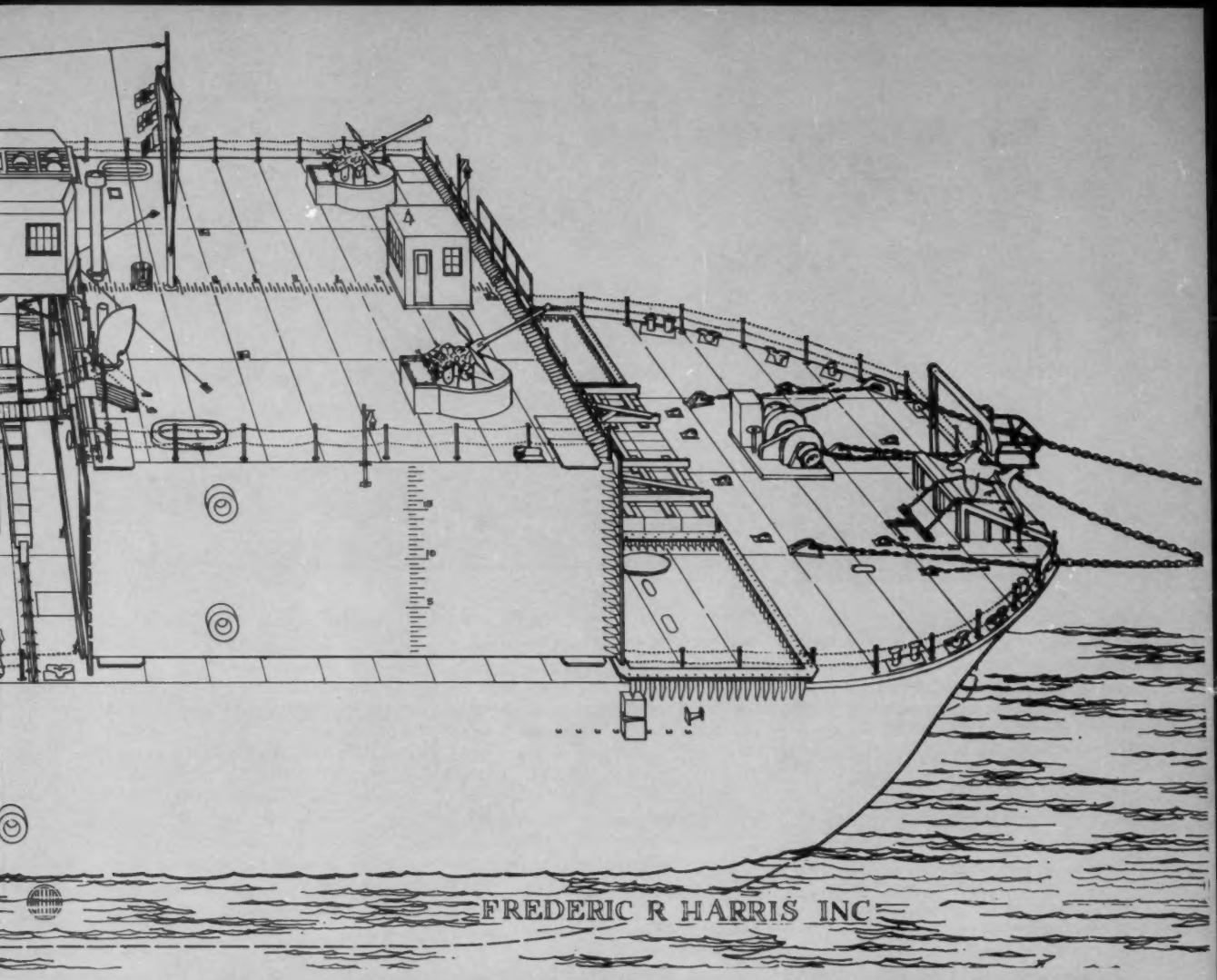
assembled dock for repair be
its place (left). If a hull se
dock needs repair, it may be un





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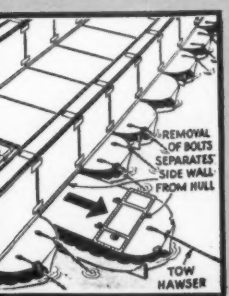
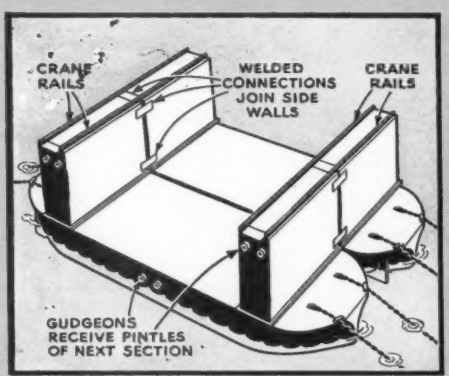
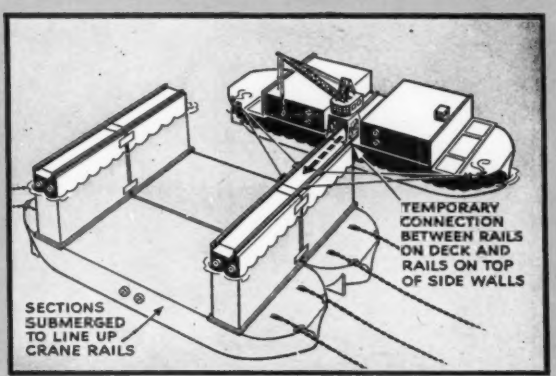
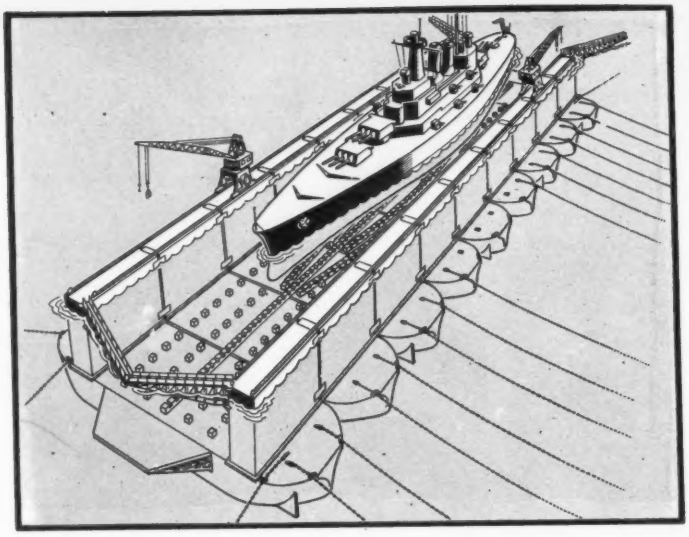




Sections are held in line by pintles that fit into gudgeons of adjoining sections. Steel plates connecting walls are bolted, then welded on.



After two sections are united, cranes are moved into place on side walls. Joined sections submerge to level of crane-carrying section's deck, and crane wheels on.



READY FOR WORK. The buoyancy chambers were pumped out and the superdreadnought "sat" high on a floating dry dock thousands of miles from established bases at Hawaii and the coasts of the United States. These ABSDs had all facilities and equipment necessary to save battle-damaged warships and to keep others at the peak of their fighting trim. The cranes moved heavy weights about the ships with ease. The hinged walkways at the forward end of the dock facilitated centering a ship as she entered. Walkways also sped passage from one wall to the other by workmen. Floating dry docks were a common sight at far-off bases in South Pacific atolls.

From the operations control house on the port wingwall deck, where the senior CEC officer was in charge during the docking operation, he was in telephone communication with all engine rooms and 14 other security posts. In addition, visual draft readings were taken at four stations. A stationary level constantly monitored deflection at each section of the dock. Depending upon the weight of the ship to be lifted and other factors, a docking operation would consume from two to eight hours, most usually not more than three to four hours.

Keel and bilge blocks had to be carefully set to accommodate the damage to the hull of the ship to be docked. Occasionally a diver would be sent into the flooded basin while the ship was still afloat to observe the configuration of damage before pumping was resumed and the block brought to bear.

After securing from the docking operation the first order of business (in the case of underwater damage) was removal of the bodies of men from spaces inaccessible to the ships company. This was often difficult. Torpedo damage to engine-room spaces often left large and heavy fragments hanging from the overhead or even lodged in the deck above. The drydock cranes and rigging crews were needed to help extricate and remove the bodies. No other dock personnel were involved; burial details from the fleet offices ashore were in charge. The Chaplain and others of the docked ship's company assisted.

No other work was done while this was being performed, and the usually noisy drydock crews were quiet and even conversations were subdued until it was finished. It was always a sad occasion. I thought, often, of those men — sometimes as many as 50 or more — whose lives had been so abruptly ended; countless plans unfulfilled, wives not found, known, married or cherished, children not conceived or reared.

The cruisers suffered worst. In addition to *Houston,* we docked the *Canberra,* also badly damaged: *Boston, Honolulu, Reno* and the New Zealand ship *Achilles.* All had taken a torpedo.

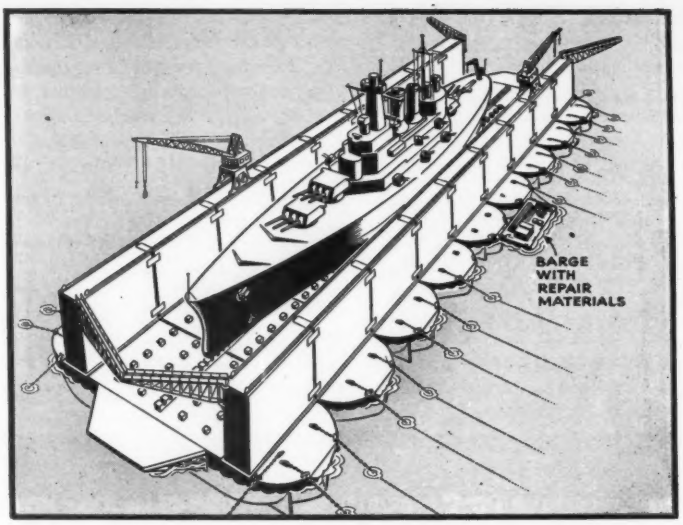
I remember *Reno,* particularly. Whenever a torpedoed ship was lifted, the smell from the debris which fell out onto our basin deck was a combination of barnacles and other marine life which fell off the hull when exposed to sunlight, and fuel oil from ruptured lines. This was our basic odor package; but the *Reno's* torpedo had fractured the reefers — so in that docking there was the added odor of a ton of rotted, sea-soaked oranges. I don't know how to describe the combination. It was distinctive.

And remember: our crew-quarters hatches opened onto the basin deck upon which this debris spilled, and they remained open day and night. Of course, the basin was hosed clean and often, but it soon became the depository for more of the same, and even when clean the odor lingered. Our shoes, after tramping about the basin all day, insured that the odor went with us wherever we went. Several ship captains even put their deck gangs over the site, scraping down the hull — onto our basin deck.

Just as we got into our busiest time (Oct. 44-Feb. 45— three notable events transpired. The ship received a message for me from the Navy Dept. which said "Congratulations on the birth of a daughter on Navy Day 27 Oct. Mother and daughter doing fine." Now I could eat again.

The second was the Navy's tremendous victories in the Philippine Sea; and third, I was commissioned Ensign, CEC. I moved from the chief's mess to the wardroom, and after a month decided that I had been demoted.

All through 1944 we had heard rumors of a super-plane which was supposed to soon become operational. It all came true in late November when the B-29 made its first flight from Saipan. Now the object of operation *FORAGER* became clear; and on top of the victories in the Philippine Sea, it meant that the end of the war was now thinkable. Off Samar and Cape Engano, in San Bernardino and Surigao Straits the enemy made four final payments due on its Pearl Harbor contract. The war had



THE SHIP ENTERS. All sections were securely joined together, the assembled dock was moored with heavy anchors and chains and was capable of raising the largest battleships and aircraft carriers. Blocks were set on the decks of the sections to fit the contours of the keel and bottom of a fighting man-of-war, and then the buoyancy chambers were flooded to lower the entire dock in order that the ship may enter. A 10-section dock had a capacity of 100,000 tons. Often two ships at a time were repaired and returned to duty at Pacific bases. In one eight-month period these floating docks handled 176 vessels of all types.

moved a long way — westward — from Pearl, Midway and "Iron-Bottom" Sound.

At a minute after midnight 29 April 1945, the ABSD-2 had its moment of naval warfare — it was struck by a torpedo.

Three or four minutes before we were struck, the three other officers in our quarters and I were wakened by a great and loud explosion. We hurried up the ladder to the wingwall deck thinking that something had happened on the ABSD-4 anchored 300 yards off our starboard beam; but there was nothing to see — no smoke or fire and their lights still burned — so we went back to bed. What we didn't know at the time was that she had taken a torpedo in the stern.

Just as I was drifting off to sleep we were hit. Our wingwall quarters rocked and bounced violently an the noise of the explosion was deafening. I assumed it to be an aerial bomb: a torpedo was unthinkable — the harbor was netted, and I believed we were out of range of land-based torpedo bombers.

Many ugly thoughts raced through my mind: Tokyo Rose had promised our sinking many times — was she going to be right after all? — the irony of the timing — I had only the day before gotten orders detaching me, with 30 days leave en route to a place called CECOS — what a ridiculous time to die — would I ever get to see my baby daughter?

In the meantime, however, I was having a hell of a time getting into my trousers. Standing on my left leg with my right leg raised to do so the right leg kept describing a 12″ diameter circle at a frequency of about four revolutions per second (were we sinking?) until I angrily snared it in a trouser leg.

On the port wingwall deck (I noticed we were not sinking) the smell of high explosives was very strong, and lying about were 2′-3′ pieces of serrated channel which I recognized as bulkhead stiffeners from the pontoon ballast tanks. Otherwise, everything seemed to be perfectly normal. The point of the explosive, outboard of the starboard wingwall, was out of our sight. I tried not to remember my earlier fright.

(We had known for a long time that the ABSD was practically unsinkable, and never by a single bomb or torpedo. But with the noise of the explosion filling my ears, the convulsions of the deck underfoot, I somehow forgot that.)

By 0019 all G.Q. stations were manned and reports of damage had been collected. The torpedo had struck section F, starboard, and the three outboard ballast tanks in that section had been ruptured, and the bulkhead of the three inboard tanks had been weakened. The machinery in the engine room space had sustained minor damage and trolley wire and topping lift of the starboard crane had been damaged. Fragments had punctured the section F wingwall in three places. The pontoon of section G was indented over a large area, but tanks remained water-tight. A motor launch was sunk. Two wingwall bolts (of 4000) were fractured. There were no fatalities on either dock.

There were three ships in the dock at the time of the attack, the *Indus* (AKN), the *Half Moon,* a tender, and an LST. The three ballast tanks lost amounted to 2% of the dock's buoyant capacity. Counterpumping of adjacent ballast tanks compensated for it. (There were a total of 120 ballast tanks in the drydock.)

An officer from ONI came aboard the following morning and we learned that ever since the decision to bypass Rabaul a year earlier, the enemy had managed to maintain and supply (by submarine) several planes which were housed in underground hangars. They had managed to fly under the radar net and attack successfully. It is hard to imagine, however, two torpedoes which did less damage. I left the ship the next day.

Also that day, 30 April 1945, Hilter died. In a hole in the ground. Quite fitting!

Repair of the ships in dock continued to completion and a week after the attack, they were undocked. At the same time, the pontoon of section F was detached (unbolted) from its wingwalls, slipped out of its place and docked, along with the *Boulder*

(Concluded next page)

A B S D

(Continued from preceeding page)

Victory, a cargo ship. Five weeks later, section F pontoon was undocked, slipped back into place, and bolted to its wingwalls. ABSD-2 was whole again.

In its first year of operation the ABSD-2 docked 65 ships totalling 538,324 tons. Four were battleships: *Iowa, New York, Pennsylvania* and *Washington;* eight cruisers, two escort carriers, two high-speed transports, one attack transport, three destroyers and many other ships. *Iowa* was the longest — 827 feet with a beam of 108 feet — and heaviest. Often several ships were docked simultaneously and several times eccentric dockings were necessary; for example, the *Houston,* 609 feet, and *Reno,* 541 feet. (The dock length was 897 feet.)

The original commanding officer was CDR J. J. Rochefort, USN, but he was relieved by CDR W. R. Lawrence, USNR. Of the 30 officers board, four were CEC officers. The others were CDR R. W. Smith, LT Forrest Crawford, and LTJG Sherman Glass — all extremely able. I was lucky to have served with them.

Many people provided assistance to me in the preparation of this article, searching for and often finding information which had escaped my memory. They are Barbara Horn, Moreell Memorial Librarian; Judith Johnston, NAVFAC Historian; D. C. Allard, Naval Historical Center; Robert A. Carlisle, Navy Office of Information; Captain Mack Angas, CEC, writing in Popular Science, *November 1945; CDR Werner Ammann, writing in the* Military Engineer, *February 1946; Captain John J. Albers; and especially Sherman Glass. I am sincerely grateful to each of them.* Ted Murphy □

A model USS *New Jersey*

• San Diego, Calif.

Refurbishing of one of the Navy's oldest warships has led to the construction of a 250-pound, 18½ foot-long brass model of the battleship USS *New Jersey* constructed by craftsmen at the Navy Public Works Center, San Diego.

The only battleship to serve in World War II, Korea and Vietnam, *New Jersey* entered the naval shipyard at Long Beach, Calif. this summer in preparation for her fourth commissioning.

As shipyard work began on the 888-foot-long, 59,000-ton dreadnought, work was being completed on an identical, (but somewhat smaller) *New Jersey* in the PWC model shop. Built to 1/48-inch scale, the brass model is a highly sophisticated replica, complete in all exterior respects above the waterline.

The purpose of the model is for research and development in designing shape and placement of high frequency antennas. Tests of the model by the Naval Ocean Systems Center permits research engineers to predict antenna performance on the actual battleship. The accuracy of predictions and recommendations is critically dependent on the accuracy of the model.

The miniature is constructed of wood and covered with 1/32-inch sheet brass which is hand-formed to fit the contours. Brass is used because it's easily formed, doesn't corrode, and is relatively inexpensive.

The superstructure above the main decks reflects all guns, rocket launchers, boat davits, etc., and are highly detailed. Exotic antennas that adorn the masts and towers are connected to coaxial cables for electronic hookup during testing.

Skilled in working from blueprints, sketches and pictures, and in the interpretation of advanced electronic Naval architecture now being developed, the craftsmen have build a literal fleet of model warships. These models include — in addition to *New Jersey* — cruisers, guided missile cruisers, destroyers, icebreakers, auxiliary craft, and several classes of aircraft carriers. The largest of these is a 23-foot model of the USS *Nimitz.*

Another battleship model built a few years ago by the shop — a 20-foot replica of the USS *Missouri* — is on permanent display at the Harry S. Truman Memorial Library in Independence, Mo.

The USS *New Jersey's* refurbishment includes installation of modern cruise missile systems (Tomahawk and Harpoon), the Vulcan Phalanx close-in weapons for self-defense, updated communications and electronics systems, and expanded aviation facilities to operate three to four helicopters. All this will be added to an already impressive arsenal of nine 16-inch guns and 20 five-inch guns, making the *New Jersey* the most powerfully armed surface ship in the free world.

Following the $326 million modernization at the Long Beach Shipyard, *New Jersey* is scheduled for sea trials in January 1983 and deployment in April 1983. □

PUBLIC WORKS TECHNICAL NOTES

Device for self-closing doors helps handicapped

• Port Huemene, Calif.

Concern for a fellow employee who is handicapped led an engineer at the Naval Civil Engineering Laboratory, (NCEL), to invent a simple device to hold open cumbersome doors. It should be a boon for all who are restricted to wheel chairs.

Harvey W. Haynes, a senior structural engineer, had noticed a colleague, John H. Ciani, struggling to open large spring-loaded doors. Ciani, a research civil engineer, works with Haynes in the laboratory's ocean engineering department.

Ciani is a victim of multiple sclerosis and has required a wheel chair for three years. He has said that constant force and effort is needed to hold the door open while wheeling through the doorway.

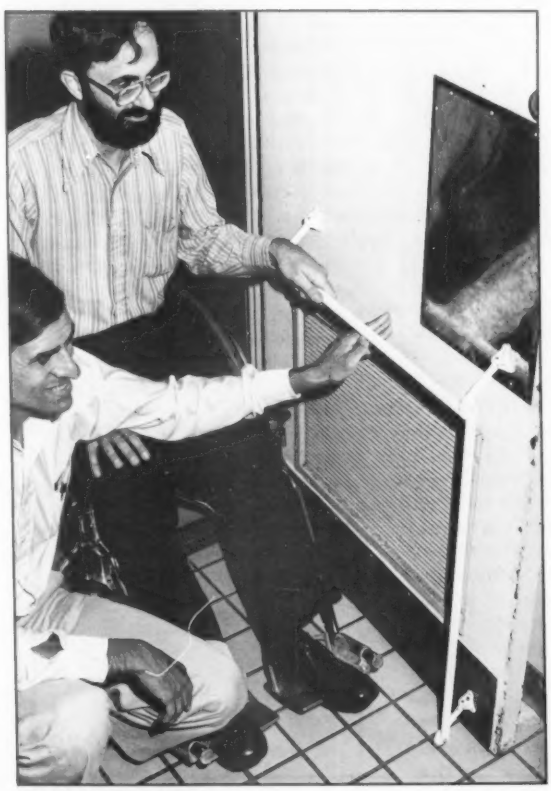
Haynes' invention, called a "doorstop for the handicapped," is an ordinary doorstop attached to the bottom of a vertical rod; the top of the rod is connected to a horizontal cross bar bolted to the door at wheelchair height. The user swings the crossbar down, and the connecting rod automatically swings the doorstop downward to the floor, bracing the door open.

Ciani said, "Now I am able to hold the door open easily by pulling down the crossbar and lowering the doorstop. I've got time to wheel my way into the room, then I just reach back, lift the crossbar, and the door closes behind me."

Explaining his interest and involvement, Haynes said, "I had just completed a personal growth training program which heightened my sensitivity toward others. I saw John struggle to open the stubborn door. The obvious fact, that he could use a doorshop, led me to the idea." In a few days, Haynes had the invention on paper and installed the prototype within two weeks.

The laboratory, which has an active program to identify and correct architectural barriers facing the handicapped, has completed four other structural modifications. An exterior ramp has been constructed to assist employees who cannot use stairs, including those on crutches. A window was installed in the entry door at the top of the ramp, affording two-way visibility. Hand rails have been added to restroom facilities, and modifications have been made to improve the useability of the laboratory's one elevator.

Haynes, with NCEL since 1966, has applied for a patent on his invention. He said, "It's such a simple idea, I'm surprised no one thought of it sooner." Ciani, in expressing his appreciation to his colleague, said of the idea, "Better today than tomorrow." □



HANDICAP HELPER — Harvey Haynes, left, engineer at the Naval Civil Engineering Laboratory, Port Hueneme, Calif., has invented a simple device that props open heavy self-closing doors. Fellow engineer John Ciani agrees that it now takes little effort to wheel through this doorway. Haynes adapted an ordinary door stop with vertical and horizontal rods to develop his invention. The user pushes down on the crossbar which plunges the door stop to the floor, bracing the door open.

Naval Facilities Engineering Command

SITUATION REPORT

ECONOMIC ANALYSIS HANDBOOK - The Economic Analysis Handbook (NAVFAC P-442) has been revised and distributed. This third edition of the handbook provides guidance on the treatment of inflation in economic analysis and updates specific guidance for Navy programs, especially those related to energy conservation. Increased emphasis on the use of sensitivity analysis and additional guidance on the treatment of risk are also included. Appendices have been added so that the handbook may serve as a reference for even the most experienced analyst. NAVFAC P-442 is also available to other qualified Navy users from the Navy Forms and Publications Center in Philadelphia (Stock Control No. 0525-LP-0377152). For all other users including contractors, it must be ordered from: Superintendent of Documents, U.S. Government Printing Office, Washington, DC 20402 (Stock order number 008-050-00205-1, $6.50 postpaid).

(NAVFAC Code 20)

NAVY FACILITIES ASSETS BASE ACCURACY EVALUATION - There are data systems within the Navy Facilities Systems that are dependent on the accuracy of the Navy Facility Assets Data Base (NFADB), i.e., Shore Facilities Planning, Real Property Maintenance Activities, Energy Applications and Environmental Quality. Also, there are several recent OPNAV studies in which conclusions of the studies were dependent on the accuracy of the NFADB. The Systems Analysis Division conducted an evaluation of the NFADB during the fall of 1980. The evaluation indicates that even though the users of summary information can be confident of a high degree of accuracy, the users of individual property records must accept a significant probability of error. Reasons for the NFADB accuracy problems appear to be related to the chronic problem of attention given to maintaining accurate property records at the activity level. Reporting new facilities and capital improvements to the NFADB by Resident Officers in Charge of Construction has a time lag of up to 3 years. The major goals of the evaluation are to call attention to the error severity rates and to generate Command level awareness in NAVFAC and at Naval Shore Activities of the criticalness of an accurate Navy Facility Assets Data Base.

(NAVFAC Code 20)

DREDGING:

Proper planning the key to success

By LT O. E. BARFIELD, JR., CEC, USN
Program Coordination Officer

DREDGED MIXTURE eventually passes through a floating pipeline to the shore.

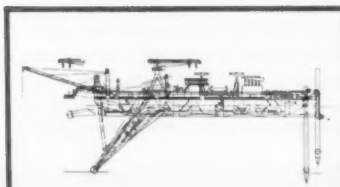
• San Bruno, Calif.

With a $18 million dredging operation on Diego Garcia producing over 9 million cubic yards of fill for the new construction program, it seems appropriate to reflect on experiences encountered while dredging in Micronesia.

The new runway for the Truk Airport required approximately 1½ million cubic yards of dredged fill. The sub-surface conditions of coral limestone in the South Pacific are somewhat similar to those around Diego Garcia, thus, similar dredge plants might be employed. There are basically three main groups utilized for moving earth in an ageous state; mechanical dredgers, hydraulic dredgers and associated ancillary equipment.

Mechanical dredgers are most clearly distinguished from other types in that they dislodge and/or raise and transport soil by mechanical means (i.e., buckets, grabs, spoon shaped tools or chisels). Some examples of mechanical dredgers are: bucket, dipper, amphibious pontoon and hopper-type grab dredgers; rockbreaker and self-elevating platform.

The principal feature of all hydraulic dredgers is that the soil is drawn up and transported by means of a centrifugal pump. This implies that the soil consists of a mixture of soil and water. Various means are employed to dislodge the soil, and among these are cutters, wheel excavators, dragheads and water jets. Some examples of hydraulic dredgers are profile, barge-unloading, cutter suction and trailing-suction dredgers.



A cutter suction dredge

Ancillary equipment is often a necessity in customizing a particular plant to meet a certain set of requirements. These include various barges and booster stations.

On Truk a cutter suction dredge was mobilized to meet the requirements of the contract. The cutter suction dredger made its appearance towards the end of the 19th century. It was developed to overcome the limitations of the profile dredger, which is unable to deal with the harder types of material and in spite of its name, cannot work to a profile.

The cutter suction dredger can do this. Mounted in front of the suction inlet is a cutting tool which, through a rotary motion, dislodges the soil and deposits it in a position to be drawn into the suction pipe. The cutter and the pipe are respectively mounted on and in a pivoting ladder which is attached to the pontoon of the dredger. The free end of the ladder is suspended from a gantry and can be raised or lowered with the aid of a winch. The dredger remains stationary. It is anchored by means of a spud, about which the cutter-head is swung by manipulating anchor wires leading out from the port and starboard sides.

Forward motion referred to as 'walking' is achieved by alternating the anchoring or in the more modern dredge plants shifting the position of the spuds. The mixture drawn up through the suction pipe passes through the pump and enters a discharge pipe. This is connected to a floating pipeline astern of the dredger, which leads to the shore. There it is connected to a land link which leads to the point of reclamation.

Cutter suction dredgers are widely used for land reclamation, hydraulic fill projects, the construction of dams and dykes, the excavation of new harbor basing and canals, and the improvement of river courses. Vessels of this type can dislodge compacted soil, work to an accurate profile and, moreover, maintain a fairly constant rate of production. They are ideally suited to many types of operations, notably those in which fairly hard material has to be shifted. However, a major drawback is the plant's inability to operate in inclement seas.

Doing business in remote locations such as Truk, the key to success is proper planning and plenty of spare parts. It is recommended to have as many as four extra cutterheads and half a dozen various impellers. Dredging coral is tough and next to the dredge operator the maintenance/repair team is the key to a successful venture.

Cutterheads come in all shapes and sizes, and are fitted with an assortment of replaceable cutter teeth.

(Continued page 30)

A new national energy policy

The President's plan to revise governmental direction

By D.M. HANNEMANN, P.E., Va.
NAVFAC HQ

• Alexandria, Va.

The Reagan Administration's Energy Policy Plan was published July 17 and submitted to Congress. Two basic principles provide the foundation of the plan: support of the administration's overall Economic Recovery Program (which includes regulatory relief), a sound monetary policy, the elimination of excessive Federal spending and taxes, and a much heavier emphasis on allowing energy decisions to be made by the free market.

The plan highlights a significant change in the role the federal government will play. These changes are: increase the development of energy resources on Federal lands; dismantle burdensome regulatory apparatus and implement energy policies that focus on market realities; and allow the use of oil, even imported, where it is less expensive than available alternatives. Other changes would decrease public spending for energy related purposes to allow the private sector to respond to market realities; and provide public spending only for long term research with high risks and potentially high payoffs.

Under the new policy market forces would set the price of oil, thus motivating investments in exploration, production and refining capacity. The leasing of federal lands for the exploration of oil would be accelerated to increase domestic production and reduce dependence on imports.

Natural gas deregulation would be reviewed, possibly with a view toward accelerating it. Signs of additional natural gas reserves in the Eastern and Western Overthrust Belts and other areas would be monitored and increased development encouraged. When natural gas is deregulated in 1985, its price is expected to be somewhere near the price of residual oil.

Federal regulations would not constrain coal demand. Leasing poli-

cies which limit coal production would be revised. These changes would create an economic environment which encourages the private sector to develop coal's potential. Because coal provides the lowest life cycle cost and maximum savings, the Navy will probably burn coal in its central heating plants scheduled for replacement.

Electric utilities would be permitted to independently make fuel decisions based upon economics. This means that provisions of the Fuel Use Act prohibiting the use of oil and natural gas will probably be repealed. Coal and nuclear power plants will probably be the economic choice of most utilities. The use of electricity is expected to grow because of its flexibility and its convenience as an energy delivery system for coal, nuclear, gas, and hydro sources. The Navy has already followed this trend. The overall consumption of energy by shore facilities has decreased 6.5% since 1975 while the consumption of electricity has increased 7.7%.

The increasing price of energy will eventually enhance the competitive position of renewable energy such as solar and wind. Tax credits to stimulate investments in renewable technologies should be continued, but are currently under attack because their elimination will help balance the Federal budget. The private sector would be encouraged to take greater responsibility for developing and marketing renewable technologies. For example, the Navy is using photovoltaic electric power at remote sites. Photovoltaic power currently is more reliable and costs less than previous systems which required air lifting fuel or batteries to the site. The Navy is also using geothermal energy to heat buildings in Iceland (see page 11) and by 1984 will be generating electricity from geothermal steam in California.

The main motivation for conservation efforts will be price and the efficient use of energy. Price will be the main motivator for conservation efforts. Fuel switching to decrease costs would also use the free market approach. Federal support would be withdrawn from technology programs where sufficient market incentives exist. Naval activities should search out and immediately do low or no cost energy conservation opportunities when they will pay back in less than one year. Centrally managed energy conservation programs such as the Energy Conservation Investment Program (ECIP) and the Energy Technology Applications Program (ETAP) are expected to continue to fund energy saving projects which cannot be funded by the activity or claimant.

For national energy security, a Strategic Petroleum Reserve of 750 million barrels by 1989 must be achieved. This reserve must be filled as rapidly as possible consistent with world oil market conditions. Private stockpiles would also be encouraged. Navy activities already have a thirty day supply of oil on hand and coal storage is encouraged where coal is burned.

Finally, federal regulatory involvement would be limited. Regulations would be simplified or eliminated where possible. Agency accountability for remaining regulatory actions would be increased. More emphasis would be placed on the cost-effectiveness of regulatory requirements. Administrative processes would be streamlined and they would weigh economic costs against effectiveness.

The Reagan Energy Plan boils down to: "Free market economics is the best energy policy." As this plan is translated into policy, it is expected that the Navy will be able to consider a wider range of options to meet our energy goals. The determining factor for any energy investment will be how fast it pays back. Energy savings will be considered first, but operation and maintenance savings and other tangible dollar savings will be included in life cycle cost estimates.

The Department of Energy (DOE) and its demonstration programs will be eliminated and DOE's role in our energy decisions will disappear as part of the easing of Federal Regulations. Necessary DOE functions will be transferred to other appropriate departments. Department of Defense energy goals are expected to remain firm in order to enhance military readiness and to reduce operating costs. The DoD energy goals also make good economic sense.

Energy projections are "best estimates" of energy availability and prices. They cannot, and should not, be used as a blueprint for the future. Future fuel costs will continue to be hard to predict. Natural gas deregulation will certainly increase its price and by 1985 the price of natural gas will probably be near the price of residual oil. However, recent decreases in oil imports, and the overall world decline in oil consumption, could be a stabilizing factor on the price of oil. Thus, it is possible that for the next several years energy prices, with the exception of natural gas, will remain relatively stable and increases will approximate world inflationary trends.

Funding of energy saving projects should be aggresively pursued at the lowest possible level. Local funding permits savings to start accruing within months instead of the one to four years usually needed for the completion of a centrally managed project. The Navy's energy strategy must be to aggressively pursue all energy projects which reduce its costs and enhance its readiness by providing flexibility in fuel sources. □

New methods of rapid runway repair pass extensive field tests

By PRESTON S. SPRINGSTON
P.E., Calif.
Naval Civil Engineering Laboratory

ONE OF THE FINAL procedures in applying the rapid runway repair system is the installation of 40-50 rock bolts to secure the membrane to the pavement. The operation protects the aircraft from possible damage from foreign objects.

• Port Hueneme, Calif.

A rapid and economical method to repair damaged runways at operational airfields has been of continuing critical concern to the Navy, Marine Corps and the Air Force.

Responding to the problem, the Naval Civil Engineering Laboratory (NCEL), Port Hueneme, Calif., has successfully developed and field tested two rapid runway repair (RRR) concepts. The principal innovation is the use of fiberglass reinforced plastic membranes. Both NCEL methods use a single prefabricated membrane as a cover over the filled crater to protect airplanes from foreign object damage (FOD) and to strengthen the repaired crater.

One method includes a second membrane sprayed in place during the repair of large craters. The application reinforces crater backfill and reduces the amount of crushed stone required.

A validation exercise involving the tri-services was recently staged at the Naval Auxiliary Landing Field, Crows Landing, Calif., to put NCEL's new techniques and applications through tests and evaluations.

The objective was the validation of membrane repair methods for the F-4 aircraft. Procedures included evaluation of FOD protection, resistance to braking (dry and wet), effects of afterburner blast, repair traffic life, and repair maintenance. In each test category, the two RRR types proved successful. Repair methods proved capable of withstanding a minimum of 1,440 passes of a fully loaded F-4 aircraft which weighed approximately 57,000 pounds including fuel.

The tests began with each crater being tested with 96 passes of a load cart simulating an F-4 landing. Then an actual aircraft spent three days landing, taking off, and taxiing on the repaired areas. The series of tests were concluded with 1200 additional passes of the load cart over the repaired crater.

The RRR concepts represent cost-effective alternatives to aluminum airfield matting. Laboratory evalua-

tions reveal that the fiberglass methods cost about $5 per square foot for surfacing compared to $19 for aluminum matting. Aluminum matting repair requires more time than the NCEL innovation and its transportation poses a major logistics problem. The NCEL system weighs 3.6 pounds per square foot of surfaced area while the aluminum matting weighs 6.6 pounds.

The tests were performed with the assistance of the Air Force Engineering and Services Center. The center conducted load cart traffic tests and coordinated with the Air Force Flight Test Center to provide aircraft support and the collection of data to monitor structural responses of the aircraft as it taxied across the repaired areas.

The RRR methods were developed by NCEL under Marine Corps sponsorship. Accordingly, the laboratory served as principal investigator for the field tests. The author originated the repair methods and was technical director for the test program; coordinated the interservice participation; and was responsible for providing technical guidance at the test site.

The backbone of the test operations was a 30-man team of Seabees from Mobile Construction Battalion Four, Port Hueneme, Calif. Although inexperienced and untrained in the new RRR techniques, the crew was able to complete both types of repairs expediently.

A manmade hole, 40 feet in diameter and 8 feet deep, simulating a bomb crater on a runway, was repaired and made ready for use by the Seabees within 5½ hours. A smaller crater, 20 feet in diameter and four feet deep, required 3¼ hours. The repair technique for the small crater consisted of a ⅜" FRP crater cover on 24" of compacted crushed stone placed atop a backfill of crater debris.

The second RRR method, applied during the repair of the large test crater, consisted of a cover (same thickness) over only 12 inches of stone. The difference between the two techniques was that the large crater repair job included the addition of an FRP membrane sprayed on the surface of backfilled crater debris. The ⅛" membrane separated the crushed stone from the debris while imparting tensile reinforcement to the stone.

Seabees transported 15 pieces of major equipment from their homeport at Port Hueneme to the test site. Under simulated attack, they were forced to mobilize their equipment from a remote staging area and begin crater repair. First, they removed excess debris from the area. For the large crater repair, some debris was needed as backfill and placed within 12 inches of the pavement surface. After being roughly graded, the debris surface was ready for the lower membrane to be installed. A fiberglass mat was spread over the surface and polyester resin was sprayed over the fiberglass.

The fiberglass mat, polyester resin and catalyst are material components of the Marine Corps Advanced Multipurpose Surfacing System (AMSS).

The NCEL RRR process has been accepted by the Air Force for its F-4s and will be included in a revised edition of manual AFR 93-2, "Disaster Preparedness and Base Recovery Planning." The manual will serve as an instruction to Air Force and Navy construction forces for the rapid repair of bomb-damaged airfields. □

SEABEES from Naval Mobile Construction Battalion 4 start excavation of simulated bomb crater in runway at Naval Auxiliary Landing Field, Crows Landing, Calif.

AN AIR FORCE F-4E plane successfully tests membrane placed over 40-foot diameter crater made usable by application of the Naval Civil Engineering Laboratory's rapid runway repair system. The aircraft performed a series of touchdowns and wheel spin ups.

• Berkeley, Calif.

An easier way for Company Commanders

By LT MICHAEL E. OAKES, CEC, USN
P.E., Tenn.

Prior to becoming a Seabee company commander, I had often imagined the job as one of planning and completing complex construction projects or leading troops through tactical situations.

In all my thoughts, though, I never saw myself explaining to the battalion XO why my personnel evaluations were two weeks overdue or, worse, doing "the old soft shoe" in the skipper's office after my shops had failed a sudden walk-through inspection.

Once in the job, however, I quickly found that many of the problems I would face involved an overall and effective administration and that there were *no* standard solutions or procedures. Finally, near the end of my tour, I realized that we were handling what used to be considered difficult situations in a routine manner. My biggest regret was that we had not known how to do these things at the beginning of the homeport/deployment cycle. Hoping to speed my relief up the learning curve, I wrote some suggestions that had worked.

Start out by setting top standards in military and professional performance and hold your platoon commanders and squad/crew leaders accountable for maintaining them. Don't compromise on military appearance and courtesy; a person who learns to get a regulation haircut and to get to work on time will usually not be a problem in other areas.

Welcome each new arrival personally. Explain company policy and conduct, performance, military courtesy (never let them leave your office saying, "yeah, or naw") and make sure they know how to use your chain-of-command to get their problems resolved.

Begin holding monthly company commander's calls within a few weeks upon assuming command. These sessions help you to find out what is going on and really strengthen your credibility as problems are speedily and publicly solved. Stress the need for these meetings with senior personnel so you can discuss new ideas, problems or policies with them.

Set a firm policy on U.A.s (unauthorized absences). I suggest one hour of squad leader supervised EMI (extra military instruction) on the evening of the offense for any U.A. up to five minutes and an additional hour for each additional five minutes.

Don't allow anyone to make excuses. The purpose is to make the cost of an occasional sleep-in prohibitive and if a first offender has to stand a few hours of EMI to establish a consistent policy, then so be it. Follow up by visiting the office during EMI and checking EMI assignment sheets and assignments (essays, etc.). Assign EMI to squad leaders for false musters.

Use NJP (non-judicial punishment) as a *last* resort. When it is overused it loses its effectiveness and the company recognizes its overuse as a substitute for leadership. My philosophy was that I didn't want my people to respond to a three-striper; I wanted them to respond to a junior petty officer. The best way to do this is to require full and proper use of EMI.

Process NJP quickly. Allow a one-day turnaround for investigations and have your adjutant track this through his log.

Delegate everything. As negative as this may sound to some, if you spend your time on policy level decisions, follow-up, inspections, and reviewing everything that crosses your desk, you will have a full-time job, with overtime. And, if you get too involved in details, you will not have time to cover 100% of your responsibilities.

Set definite and firm deadlines for all assignments that you give to your people. They appreciate knowing your requirements and, if you negotiate the deadlines with them whenever possible, they will usually meet their obligations, thus enabling you to make reliable commitments to *your* boss.

Visit all your job sites and shop spaces weekly (a few each day). I found that I could not rely on monthly staff meetings to give me a current picture of what was going on and only by talking to those at the construction level and asking specific questions could I determine how policy was being interpreted.

I believe the occasional differences between what I intended and what was happening to be honest failures of communication, but the only way to guarantee the end result was to spend some time at both ends. You will have to make time for this, but I highly recommend it.

Inspect your compound and office spaces weekly for cleanliness and order just as you do your personnel and barracks. Put any gigs in writing to your supervisor and follow up item by item. Get your men used to maintaining shipshape office, shops and yards.

Put top people in your staff jobs. These jobs require more initiative and have more individual effect on the company than the more glamorous jobs in the field. Brief each one on the importance you place on the job and its responsibilities. It's also a good idea to review your management assistance visit checklists with them every few weeks. To promote good performance in the job, I suggest letting the person know you'll relieve them at mid-deployment and give them a good field job if desired. His relief should be someone who has performed equally well in the field during the first half of the deployment.

Assign a good senior member as company adjutant to supervise your administrative clerks and to function as senior (and permanent) training petty officer. A smooth running office with a reputation for responsiveness to battalion staff will keep most administrative matters from arriving at your level for action.

Brief your administrative staff not to let division officer records (DORs) out to other personnel unless the company chief or platoon commander is present. This point should

(Continued next page)

Company commanders CAN solve their problems

be covered as part of the indoctrination of new men assigned to work in the office.

Don't turn the responsibility and accountability for your personnel over to other departments when they are assigned to working parties or training, etc. Always charge the senior member as responsible for the group reporting on time and to report any U.A.s or other problems directly back to the company.

In certain types of training (special construction battalion training (SCBT)) where specific numbers and types of ratings are required to fill a class, identify possible replacements ahead of time and empower your training petty officer to requisition replacements from platoon commanders if someone is unavailable.

Take plenty of time on evaluations. Read each one yourself and make sure that they contain an accurate portrayal of the individual and what was specifically performed and not a general statement of poor, average or outstanding performance for each rating. Don't hesitate to make a hard call to describe the failings of a weak performer just as you would the success of a strong one, whether non-rated or a chief petty officer.

I also recommend, prior to each evaluation cycle, giving your supervisors a sample of a correct evaluation for the rate involved and conducting a short class, along with your company chief, detailing the specific requirements of the 'evals' (i.e., support of equal opportunity program, participation in physical fitness program, ability for oral and written expression, etc.) and your standards regarding the accurate portrayal discussed.

Finally, on the subject of evaluations, many petty officers and even some CPOs have never learned to write good evaluations since enough time was not allowed to bounce them back for re-write. This is because we don't require their submission until the 'evals' are due at battalion. If they need more work, the company commander and chief spend a few nights and a weekend writing them.

Consequently, your average lieutenant and master chief write a pretty good 'eval' while the supervisors don't even find out what was wrong with their contribution. Therefore, I'd suggest requiring your supervisors to have 'evals' to you 30 days prior to the date due to allow time for your 'chop' and their rewrite.

The method set forth here or similar ones, are hardly profound and become pretty obvious to an experienced company commander. However, I hope new company commanders may be saved from some of the "slings and arrows of outrageous fortune" which have pitted the collective hide of old ones. □

FIRST CALL . . .

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FINAL CALL . . .

. . . to be included in CEC Personal Data Book, published by the Association of Navy Civil Engineer Corps Officers.

All officers and warrant officers (active, inactive, retired, etc.) are invited to submit information (send for questionnaire) for inclusion. Officers desiring membership (or renewal) and a copy of the 1982 Personal Data Book should send a check or money order in the amount of $7.00, payable to:

Association of Navy Civil Engineer Corps Officers

c/o Commander (Attn: Code 09MS)
Naval Facilities Engineering Command
200 Stovall Street Alexandria, VA 22332

DREDGING:

(Continued from page 23)

Don't be surprised if throughout the early portion of the contract you experience more down time than operating hours. The dredge operator will be experimenting with various configurations of swing-speed and bite to increase the percentage of solids being transported. The cutter suction dredger can transport up to 2,000 cubic yards per hour which is directly related to the distance which the material is transported.

A primary threat to the dredging operator is the possibility of carrying too great a percentage of solids in relation to head pressure resulting in the pipe clogging. In many instances it has been deemed more economical to abandon these pipes in place rather than unclog them. In judging performance of the dredge, several methods can be employed. A detailed survey of the area to be filled with monthly spot surveys during the construction period is probably the most accurate method of tracking performance.

Remember to be mindful of the hours of operation, noting down time and reasons. Every dredge has a historical profile of its jobs and performance as well as a detailed log of its activity throughout each job. Spot checks of these records are mandatory for inspectors daily reports. Another check employed was a velocity gauge, which when recorded three times daily gave a fairly accurate estimate of production.

Silt-curtains or booms, required in most cases by the EPA and usually specified, are only marginally effective in the containment of suspended materials. There is no reason for deployment of curtains around the dredge; the reclamation area is the problem.

When direct placement is required, the area should be totally contained, i.e., a basin configuration with segmented settling basins. Filling should be alternated to avoid the build up of lens of fine material which can ultimately result in shear planes. Test bores with continuous samples are your best tool in insuring quality material.

Often coral boulders (too hard to break up with the cutter head) will be encountered. A practice of dredging from the bottom up is typically employed, thereby undermining the boulders to allow them to roll to the bottom of the dredged area.

And the list goes on. So, if you become confronted with dredging without previous operational knowledge a good point of contact in this area is Phil Granek, Director of the Construction Division at PACDIV, or the author. □

DOING BUSINESS in remote locations, the key to success is proper planning and plenty of spare parts.

Letters . . .

It is really a shame that you wrote the misleading headline for my paper on metric conversion, apparently without reading or understanding the content. My paper pointed out the positive actions being taken by the DoD.

1. The OUSD(R&E) direction to metricate the 40,000 plus Military and Federal Specifications by 1990;
2. The adoption and use of the several ASTM and ANMC metric standards;
3. The positive attitude of DoD architects and engineers in designing and constructing metric facilities overseas; and
4. The potential benefits through modular coordination and simplified calculations.

As I tried to point out to you on the phone, the UK had problems because they didn't complete detail planning before going to SI. We in the United States have learned from that mistake and are working with the building products people to rationalize sizes in SI, not just convert.

Again, I am sorry and I take the blame for not explaining in my paper in pure simple English that we in the DoD and the building sciences feel that metrication is progressing smoothly and rationally. Please read my paper again and then consider retracting your headline, "not much in the foreseeable future." There really is no "if" in *metrication*.

Sincerely,
LEE E. ROGERS, P.E. Program Analyst
Defense Materiel Specifications
& Standards Office OUSD(R&E)

□ Rogers is referring to "What's happening in the way of Metric Conversion? . . . not much in the foreseeable future" (page 20, Summer 1981, *The Navy Civil Engineer*). The Editor, having read and understood the contents, created the headline title. In pure simple English Rogers further points out that there is no "if" in *metrication;* this is quite elementary inasmuch as there is *no metrication*. There is an "if" in metri*fic*ation (See *Webster's Third New International Dictionary*). Following Rogers' request the Editor has scholarly and dedicatedly re-read the text and opines as far as metric conversion is concerned not much is happening in the foreseeable future. HW

NAVY CIVIL ENGINEER

READERS SURVEY RESULTS 1981

I AM
54 USN **22** USNR **13** USNR (Inactive)
73 Civilian Employee
0 Paid Subscriber **9** Other

I AM ASSIGNED TO
22 NAVFAC **15** ROICC
24 EFD **6** STAFF
8 PWC **17** RESERVE
11 SEABEE **8** CBC
51 OTHER

MY GRADE IS **GS-12 (Average)**
LCDR

I have **19** years of accredited education (elementary, high school, college).
I hold a **B.S.** degree in **Civil Engineering (77 hold Masters and Doctorate degrees).**
I have **13** years of government service (civilian and armed forces combined).
I have/have not contributed articles or material to The Navy Civil Engineer. **38** have; **120** have not contributed.
I have been a reader of The Navy Civil Engineer for **9** years.
I usually read: **42** all; **100** more than half; **23** less than half; **2** hardly any of the contents of The Navy Civil Engineer.

MY RATING OF THE MAGAZINE

	Excellent	Good	Fair	Poor
My *overall* opinion is	91	66	2	0
and of editorial content	79	42	4	0
and of format	102	54	6	0
and of page design	102	51	7	0
and of photographs	102	52	8	0
and of printing and paper stock	108	51	3	0
and of mailing and distribution	106	49	7	3

DELIVERY AND AVAILABILITY

155 I receive my copy through the mail.
153 It arrives in good condition.
2 It does not arrive in good condition.
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36 Copies are easily and readily received.
6 Copies are not easily obtained.
0 I read my copy in a library or other central source.
The copy I read is shared with **4** others.

OF THE STANDING FEATURES

	I READ	DON'T READ
Speaking from Topside	134	11
Advice of Counsel	122	26
NAVFAC SitRep	129	22
PW Tek Notes	108	33

ARTICLE PREFERENCES

	I LIKE	DON'T LIKE
Research and Development	121	17
Management	132	12
Education and Professional Development	130	10
Engineering and Construction	152	3
Technical Articles	126	10
Seabee Operations	118	19
Reserves	77	45
Environmental Subjects	108	24
Energy Management	118	19
Housing	82	44
Historical Features	144	11

FREQUENCY

I prefer to receive the magazine
49 Monthly
38 Bi-monthly
74 Quarterly

This year's Reader Survey received 173 responses (down from 208 received in 1979) and represented 1% of the general circulation. Particularly noteworthy was that 108 readers included personal suggestions and/or remarks. These observations are of great value to the editorial staff and to the Command's Editorial Review Board, however, individual acknowledgment is not feasible. One reader suggested that articles on airfield repair and dredging would be welcome. *Coincidentally* we respond on pages 23 and 26. The survey results and individual comments are available for inspection in the editorial offices. Appreciation is further extended members of the CECOS staff who opened and tabulated the returns independent from editorial staff members. They are: Sandy Hubbard, Kay Henderson and Sherri Bergman.

The Editors

A shift in facility funding

Rear Admiral Taylor

• Washington, D.C.

For 200 years the Navy has been grappling for answers to the question: "How much money and manpower is *really* needed to build, operate and maintain our shore bases?"

Today, it is more critical that the Navy find valid and supportable answers to this question. The cost of capital investments ashore and the resources to run and preserve them have become large, attractive targets for proponents of other needy causes.

Unless the long-standing question is finally answered to the satisfaction of Navy decision makers, there could be significant future impact on the resources allocated to shore bases and on the ability of shore bases to perform their missions.

The Navy decision makers who control the entire bag of Navy money and manpower are the Deputy Chiefs of Naval Operations for Air Warfare, Surface Warfare, Submarine Warfare, Logistics, R&D, etc. Each of these three-star admirals "owns" a "vertical" slice of the Navy and the associated resources.

For instance, DCNO(AIR) buys and pays the annual operating and maintenance costs of all fleet aircraft, aircraft carriers, and all operating Naval Air Stations. Their decisions determine the size of the major claimant budgets and manpower allowances, and the distribution of resources among the various Navy programs. They can trade off manpower for fuel, or new airplanes for new hangars, or ship construction for real property maintenance. They support shore bases with resources which could alternatively be used to procure, operate, maintain, and modernize ships, aircraft and other weapons systems. Accordingly, shore base requirements compete vigorously with fleet requirements, for a share of the limited resources available to each DCNO.

The DCNOs want to support their shore bases with an adequate share of their resources. But shore base requirements are very difficult to quantify, and not everyone shares a common notion of what constitutes an "adequate" resource level.

Some people believe that shore bases are currently over-funded, over-staffed and ripe for economy actions that would free scarce dollars for ships, aircraft and weapons systems accounts.

Others say that shore bases are grossly under-supported and have not yet recovered from the erosion of readiness that resulted from the diversion of money away from their support during the Vietnam era.

Which side is right?

The fact is that the Navy has yet to devise a formula that demonstrates a conclusive statement of the resource requirements of our shore bases. Consequently, the DCNOs have no sure way to tell if their bases are getting more or less than their fair share.

Resources support for shore bases is currently at an all-time high. This has been achieved by presenting the DCNOs various data from engineer/management instruments such as the Annual Inspection Summary and the Shore Facilities Planning System. However, the influence of such instruments is tending to pale when compared to the emerging clarity of other fleet resource/readiness relationships. The reason for this is that DCNOs perceive that the existing methods of quantifying shore base requirements focus primarily on the needs of *facilities* rather than on the needs of *mission*.

DCNOs want to know what their money and manpower will achieve for the Navy, not just in terms of more or better facilities, but in terms of mission capability. They also desire to be told these things by the people who bear responsibility for mission performance and with whom they normally communicate on the subject of fleet readiness . . . the major claimants.

For these reasons, the Vice Chief of Naval Operations recently directed several major claimants to assess the adequacy of shore base resources in terms of readiness. This fall, direct feedback from major claimants and commanding officers of operating shore bases will be presented to DCNOs in a format similar to that used by Navy operating units to report their readiness status. The intent is to enable the DCNOs to evaluate and compare readiness data of shore bases to similar readiness data of ships, aircraft and weapons systems.

Such a comparison should permit an intelligent balancing of shore base support requirements with those of the rest of the Navy.

No one can predict with any certainty just how much the current shore base resources levels will change as a result. But public works organizations, claimant staffs, and NAVFAC construction and maintenance offices could feel significant repercussions.

This new initiative by the Navy to recognize its shore bases as vital parts of its operating infrastructure, and to determine their proper support resources on the basis of measuring their readiness to perform assigned missions is a fundamental shift in the view of shore bases.

We in the Civil Engineer Corps, no matter what our prospective, should watch its development with care and a hint of optimism. □

Director
Shore Activities
Planning & Programs,
Office of the Chief
of Naval Operations

LTJG Clifford S. Linder
MSCE/U. of N.H.
to San Diego, Calif.

ENS Barry K. Loveless
BSSE/USNA
to Gulfport, Miss.

LTJG Larry J. Macias
MA Arch/U. of N.M.
to Subic Bay, R.P.

ENS John S. Marcellis
BSCE/U. of Wis.
to Whidbey Island, Wash.

•LT William J. McCullum
BSEE/U. of Utah
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ENS Robert E. Morgan
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ENS Christopher J. Moosey
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ENS James R. Pond
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ENS Jimmie D. Poore
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ENS Michael J. Price
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ENS Vincent Racanelli
BSC/Clarkson Coll.
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ENS Stephen M. Yoza
BEEE & Math/Vanderbilt
to Pensacola, Fla.

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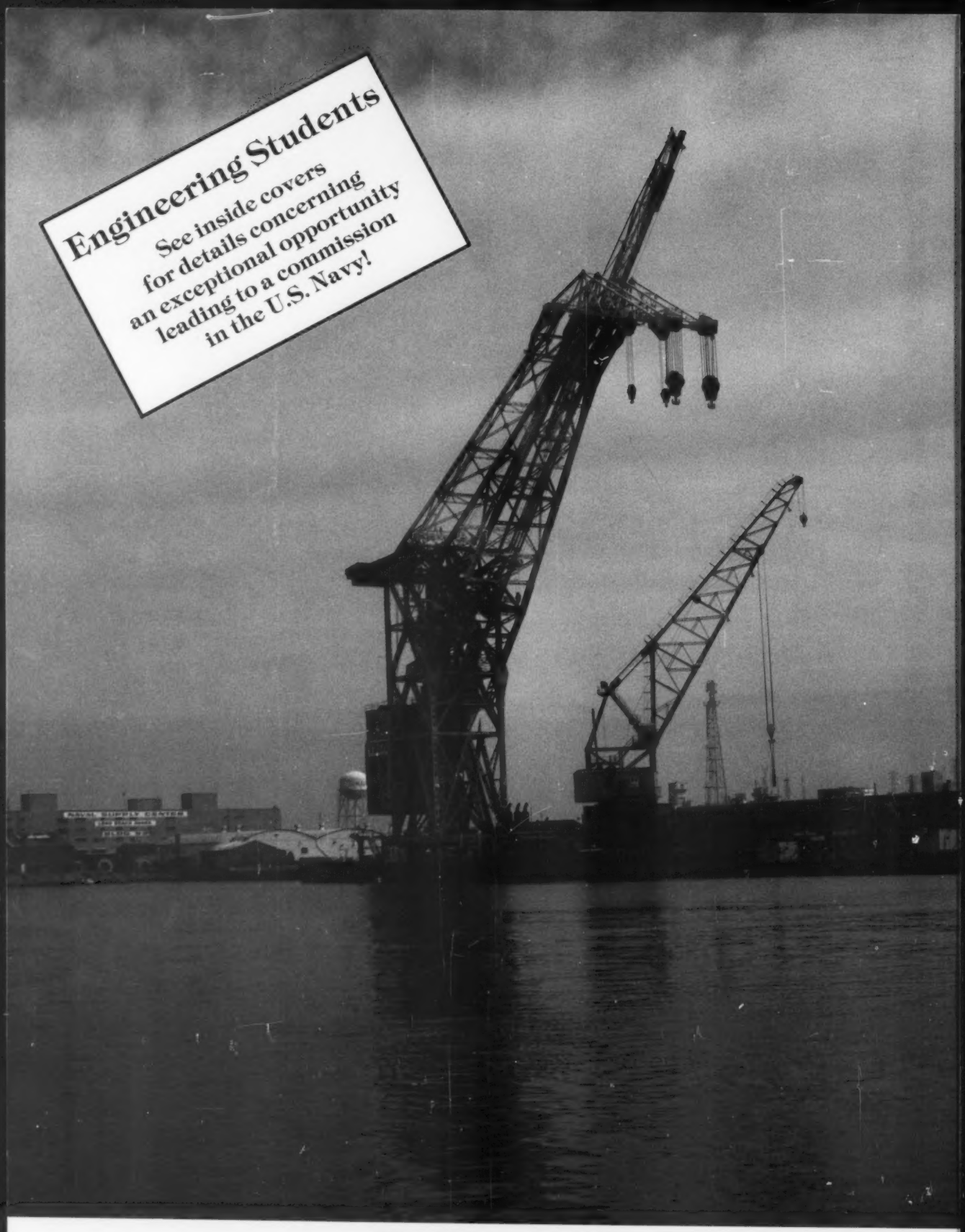

The Days of Giants

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